

September 1, 2005

Mr. Steve Trent Fluor Hanford Inc. 825 Jadwin Avenue Richland, WA 99352

Reference:

P.O. #630

Eberline Services R5-07-031-7293, SDQ H3246

Dear Mr. Trent:

Enclosed is the data report for four soil samples designated under SAF No. F05-023 received at Eberline Services on July 7, 2005. The samples were analyzed according to the accompanying chain-of-custody documents.

Please call if you have any questions concerning this report.

Sincerely,

Melissa C. Mannion

Senior Program Manager

Meliosa Marra

MCM/

Enclosure: Data Package

**EDMC** 

**Analytical Services** 2030 Wright Avenue P.O. Box 4040 Richmond, California 94804-0040 (610) 235-2633 Fax (510) 235-0438 Toll Free (800) 841-5487 www.eberlineservices.com

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#### 1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H3246 was composed of four soil samples designated under SAF No. F05-023 with a Project Designation of: 216-A-8 Crib Characterization Borehole.

The Tc-99, C-14, and H3 samples in SDG H3246 were analyzed in preparation batches with QC samples from SDG H3228.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

# 2.0 ANALYSIS NOTES

2.1 Tritium Analyses

No problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.3 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.4 lodine-129 Analyses

No problems were encountered during the course of the analyses.

2.5 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

#### Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa C. Mannion

Senior Program Manager

9/1/5 Date

# EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP H3246

SDG <u>7293</u> Contact <u>Melissa C. Mannion</u> Client Hanford
Contract No. 630
Case no SDG H3246

# SUMMARY DATA SECTION

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Prepared by

Much Morn

Reviewed by

SAMPLE DELIVERY GROUP H3246

SDG 7293
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hanford
Contract	No. 630
Case no	SDG H3246

# ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

#### SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

#### PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

#### WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

#### METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

#### LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

REPORT GUIDES
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SAMPLE DELIVERY GROUP H3246

SDG <u>7293</u> Contact <u>Melissa C. Mannion</u>

GUIDE, cont.

Client <u>Hanford</u>
Contract <u>No. 630</u>
Case no <u>SDG H3246</u>

#### ABOUT THE DATA SUMMARY SECTION

#### DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

#### MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

#### DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

#### METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

#### REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

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SAMPLE DELIVERY GROUP H3246

SDG 7293
Contact Melissa C. Mannion

# SAMPLE SUMMARY

Client Hanford

Contract No. 630

Case no SDG H3246

CLIENT SAMPLE ID	LOCATION	Matrix Level	LAB SAMPLE ID	SAF NO	CHAIN OF	COLLECIED
B1D992	216-A-B, I-5	SOLID	R507031-01	F05-023	F05-023-030	06/23/05 13:40
B1D993	216-A-8, I-6	SOLID	R507031-02	F05-023	F05-023-031	06/27/05 12:05
B1D994	216-A-8, I-7	SOLID	R507031-03	F05-023	F05-023-032	06/29/05 09:05
B1D995	216-A-B, I-8	SOLID	R507031-04	F05-023	F05-023-033	06/30/05 07:05
Method Blank		SOLID	R506205-06	F05-023		
Method Blank		SOLID	R506205-09	F05-023		
Method Blank		SOLID	R507031-06	F05-023		
Method Blank		SOLID	R507031-09	F05-023		
Lab Control Sample		SOLID	R506205-05	F05-023		
Lab Control Sample		SOLID	R506205-08	F05-023		
Lab Control Sample		SOLID	R507031-05	F05-023		
Lab Control Sample		SOLID	R507031-08	F05-023		
Duplicate (R507031-03)	216-A-8, I-7	SOLID	R507031-07	F05-023		06/29/05 09:05
Duplicate (R507031-03)	216-A-8, I-7	SOLID	R507031~10	P05-023		06/29/05 09:05

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SAMPLE DELIVERY GROUP H3246

SDG 7293\_\_\_\_\_\_\_Contact Melissa C. Mannion

QC SUMMARY

Client Hanford

Contract No. 630

Case no SDG H3246

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	\$ SOLIDS	SAMPLE	BASIS AMOUNT	DAYS S		LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7288		Method Blank	SOLID			,			R506205-06	7288-006
		Method Blank	SOLID						R506205-09	7288-009
		Lab Control Sample	SOLID						R506205-05	7288-005
		Lab Control Sample	SOLID						R506205-08	7288-008
7293	F05-023-030	B1D992	SOLID	97.7	144 g		07/07/05	14	R507031-01	7293-001
	F05-023-031	B1D993	BOLID	97.7	179 g		07/07/05	10	R507031-02	7293-002
	F05-023-032	B1D994	SOLID	97.5	1 <b>4</b> 6 g		07/07/05	8	R507031-03	7293-003
	F05-023-033	B1D995	SOLID	91.5	261 g		07/07/05	7	R507031-04	7293-004
		Method Blank	SOLID						R507031-06	7293-006
		Method Blank	SOLID						R507031-09	7293-009
		Lab Control Sample	SOLID						R507031-05	7293-005
		Lab Control Sample	SOLID						R507031-08	7293-008
		Duplicate (R507031-03)	SOLID	97.5	146 g		07/07/05	8	R507031-07	7293-007
		Duplicate (R507031-03)	SOLID	97.5	146 g		07/07/05	8	R507031-10	7293-010

QC SUMMARY

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Lab id <u>EBRINE</u>

Protocol <u>Hanford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-QS</u>

Version <u>3.06</u>

Report date <u>08/31/05</u>

SAMPLE DELIVERY GROUP H3246

SDG	7293	
Contact	Melissa Ç.	Mannion_

#### PREP BATCH SUMMARY

Client	Hanford
Contract	No. 630
Case no	SDG H3246

TEST	MATRIX	METHOD	PREPARATION BATCH	ERROR 20 %	CTIERL	MORE	PLA	NCHRTS :		DUP/ORIG MS/ORIG	QUALI- FIERS	
Beta	Counting											
TC	SOLID	Technetium 99 in Solids	7132-197	10.0	4			1	1	1/1		
Ganna	Gamma Spectroscopy											
GAM	SOLID	Gamma Scan	7132-197	15.0	4			1	1	1/1		
ī	SOLID	Todine 129 in Solids	7132-197B	10.0	4	-		1	1	1/1		
Liqui	d Scintil	lation Counting										
C	SOLID	Carbon 14 in Solids	7132-197	10.0	4			1	1	1/1		
н	SOLID	Tritium in Solids	7132-197	10.0	4			1	1	1/1		

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group. Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY

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Protocol <u>Hanford</u>

Version	Ver 1.0
Porm	DVD-PBS
Version	3.06
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00000008

Lab id EBRLNE

SAMPLE DELIVERY GROUP H3246

SDG 7293
Contact Melissa C. Mannion

# WORK SUMMARY

Client Hanford
Contract No. 630
Case no 8DG H3246

CLIENT SAMPLE	TD		LAB SAMPLE II	)							
LOCATION		MATRIX	COLLECTED				SUF-	1 W 1 V 1/7 W 10	DEVERTIBLE	DV	METHOD
CUSTODY	SAF No		RECEIVED	PLANCHET	TEST	•	FIX	ANALYZED	REVIEWED	BY	WETHOD
B1D992			R507031~01	7293-001	c			07/29/05	08/09/05	MWT	Carbon 14 in Solids
216-A-8, I-5		SOLID	06/23/05	7293-001	GAM			08/12/05	08/26/05	MWT	Gamma Scan
F05-023-030	F05-023		07/07/05	7293-001	P			07/29/05	08/04/05	MWT	Tritium in Solids
				7293-001	I			08/17/05	08/22/05	MWT	Iodine 129 in Solids
				7293-001	TC	_ :	<b>A</b> 1	08/27/05	08/30/05	MWT	Technetium 99 in Solids
B1D993			R507031-02	7293-002	c			07/29/05	08/09/05	MWT	Carbon 14 in Solids
216-A-8, I-6		SOLID	06/27/05	7293-002	GAM			08/12/05	08/26/05	MWT	Gauma Scan
F05-023-031	F05-023		07/07/05	7293-002	H			07/30/05	08/04/05	MWI	Tritium in Solids
				7293-002	I			08/17/05	08/22/05	MWT	lodine 129 in Solids
				7293-002	TC		Al	08/27/05	08/30/05	MWT	Technetium 99 in Solids
B1D994			R507031-03	7293-003	С			07/29/05	08/05/05	MWT	Carbon 14 in Solids
216-A-8, I-7		SOLID	06/29/05	7293-003	GAM			08/25/05	08/26/05	MWT	Gamma Scan
F05-023-032	F05-023		07/07/05	7293-003	H			07/30/05	08/04/05	MWT	Tritium in Solids
				7293-003	I			08/18/05	08/22/05	MWT	Iodine 129 in Solids
				7293-003	TC	_	<b>A</b> 1	08/27/05	08/30/05	MWT	Technetium 99 in Solids
B1D995			R507031-04	7293-004	c			07/29/05	08/09/05	MWT	Carbon 14 in Solids
216-A-8, I-8		SOLID	06/30/05	7293-004	GAM			08/17/05	08/26/05	MWI	Gamma Scan
F05-023-033	P05-023		07/07/05	7293-004	н			07/30/05	08/04/05	MWT	Tritium in Solids
				7293-004	I			08/18/05	08/22/05	MWT	Iodine 129 in Solids
				7293-004	TC		<b>A</b> 1	08/29/05	08/30/05	MWT	Technetium 99 in Solids
Method Blank			R506205-06	7288-006	C			07/28/05	08/08/05	MWT	Carbon 14 in Solids
		SOLID		7288-006	H			07/29/05	08/04/05	MWT	Tritium in Solids
	F05-023										
Method Blank		-	R506205-09	7288-009	TC			08/27/05	08/30/05	MWT	Technetium 99 in Solids
		SOLID									
	F05-023										
Method Blank			R507031-06	7293-006	GAM			08/16/05	08/26/05	MWI	Gamma Scan
		SOLID									
	F05-023										
Method Blank			R507031-09	7293-009	ı			08/18/05	08/22/05	MWT	Iodine 129 in Solids
		SOLID									
	F05-023										

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 Lab id
 EBRLNE

 Protocol
 Hanford

 Version
 Ver 1.0

 Form
 DVD-CWS

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 3.06

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SAMPLE DELIVERY GROUP H3246

SDG	7293		
Contact	Melissa	Ç,	Mannion

# WORK SUMMARY, cont.

Client Hanford
Contract No. 630
Cage no SDG H3246

CLIENT SAMPLI LOCATION CUSTODY	E ID SAF No	MATRIX	LAB SAMPLE III COLLECTED RECEIVED	PLANCHET	TEST	SUF-	analyzed	REVIEWED	ВУ	METHOD
Lab Control	Sample		R506205-05	7288~005			07/29/05	08/08/05	MWT	Carbon 14 in Solids
	F05-023	SOLID		7288-005	H 		07/30/05	08/04/05	MWT	Tritium in Solids
Lab Control	Sample	SOLID	R506205-08	7288-008	TC		08/27/05	08/30/05	MWT	Technetium 99 in Solids
	F05-023									
Lab Control	Sample	SOLID	R507031-05	7293-005	MAD		08/29/05	08/29/05	MWT	Gamma Scan
	F05-023					_			_	
Lab Control	Sample	SOLID	R507031-08	7293-008	I	_	08/18/05	08/22/05	MWT	Todine 129 in Solids
	F05-023									
Duplicate (R	507031-03)		R507031-07	7293-007	С		07/29/05	08/09/05	MWT	Carbon 14 in Solids
216-A-8, I-7		SOLID	06/29/05	7293-007	GAM		08/16/05	08/26/05	MWT	Gamma Scan
-	F05-023		07/07/05	7293-007	H		07/30/05	08/04/05	MAT	Tritium in Solids
				7293-007	I		08/19/05	08/22/05	MWT	Todine 129 in Solids
Duplicate (R	507031-03)		R507031-10	7293-010	TC		08/27/05	08/30/05	MWT	Technetium 99 in Solids
216-A-8, I-7	•	SOLID	06/29/05							
	F05-023		07/07/05							

TEST	saf No	COUNTS	OF TESTS BY	SAMPLE TYPE CLIENT MORE	RE BLANK	LCS	DUP SPIKE	TOTAL
с	F05-023	Carbon 14 in Solids	C14_COX_LSC	4			1	7
GAM	F05-023	Gamma Scan	Gamma_GS	4	1	1	1	7
H	F05-023	Tritium in Solids	TRITIUM_COX_LSC	4	1	1	1	7
I	F05-023	Iodine 129 in Solids	I129_SEP_LEPS_GS	4	1	1	1	7
TC	P05-023	Technetium 99 in Solids	TC99_TR_SEP_LSC	4	1	1_	1	7
TOTALS				20	5	5	5	35

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 EBRINE

 Protocol
 Hanford

 Version
 Ver 1.0

 Form
 DVD-CWS

 Version
 3.06

 Report date
 08/31/05

#### EBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP H3246

R506205-06

#### METHOD BLANK

Method Blank

	7293 Melissa C. Mannion	Client/Case no Contract	SDG_H3246
Lab sample id Dept sample id		Client sample id Material/Matrix SAF No	SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	Test
Tritium	10028-17-8	-0.298	1.8	3.0	400	ซ	H
Carbon 14	14762-75-5	-0.518	1.8	3.2	50	U	C
Total Strontium	SR-RAD	N.A.			1.0		SR
Thorium 228	14274-82-9	N.A.					TH
Thorium 230	14269-63-7	N.A.			1.0		TH
Thorium 232	TH-232	N.A.			1.0		$\mathbf{T}\mathbf{H}$
Total Uranium (ug/g)	7440-61-1	N.A.			1.0		U_T U
Uranium 233/234	U-233/234	N.A.			1.0		U
Uranium 235	15117-96-1	N.A.			1.0		U
Uranium 238	U-238	N.A.			1.0		U
Neptunium 237	13994-20-2	N.A.			1.0		NP
Plutonium 238	13981-16-3	N.A.			1.0		PU
Plutonium 239/240	PU-239/240	N.A.			1.0		PU
Americium 241	14596-10-2	N.A.			1.0		AM
Iodine 129	15046-84-1	N.A.			2.0		I

216A8 Crib Characterization Borehole

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METHOD BLANKS
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Lab id EBRLNE
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Form DVD-DS
Version 3.06
Report date 08/31/05

# EBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP #3246

R506205-09

#### METHOD BLANK

Method Blank

	7293 Melissa C. Mannion	Client/Case no Contract	SDG_H3246
Lab sample id Dept sample id		Client sample id Material/Matrix SAF No	 SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Technetium 99	14133-76-7	0.150	0.23	0.54	15	ט	TC

216A8 Crib Characterization Borehole

QC-BLANK	54124			

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# EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP H3246

R507031-06

#### METHOD BLANK

Method Blank

SDG <u>7293</u> Contact <u>Melissa C. Mannion</u>	Client/Case no Contract		SDG_H3246
Lab sample id <u>R507031-06</u> Dept sample id <u>7293-006</u>	Client sample id Material/Matrix SAF No	— —-	SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	PC1/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	Ū		0.49		U	GAM
Cobalt 60	10198-40-0	U		0.045	0.050	ט	GAM
Antimony 125	14234-35-6	U		0.11		U	GAM
Cesium 134	13967-70-9	U		0.056		ប	GAM
Cesium 137	10045-97-3	U		0.049	0.10	U	GAM
Radium 226	13982-63-3	σ		0.085		U	GAM
Radium 228	15262-20-1	บ		0.21		U	GAM
Europium 152	14683-23-9	Ū		0.13	0.10	U	GAM
Europium 154	15585-10-1	ប		0.15	0.10	U	'GAM
Europium 155	14391-16-3	σ		0.13	0.10	Ū	GAM
Thorium 228	14274-82-9	Ū	•	0.070		Ü	GAM
Thorium 232	TH-232	Ü		0.21		บ	GAM
Uranium 235	15117-96-1	บ		0.18		U	GAM
Uranium 238	U-238	ប		5.7		ប	GAM
Americium 241	14596-10-2	U		0.16		ט	GAM

216A8 Crib Characterization Borehole

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QC-BLANK	#53671		

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 Report date
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# EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP H3246

R507031-09

#### METHOD BLANK

Method Blank

SDG Contact I	7293 Melissa C. Mannion	Client/Case no Contract	 SDG_H3246
Lab sample id properties to be the sample in the sample id properties to be the sample id pro	<del></del>	Client sample id Material/Matrix SAF No	 SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Iodine 129	15046-84-1	-0.405	0.48	1.1	2.0	U	I

216A8 Crib Characterization Borehole

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SAMPLE DELIVERY GROUP H3246

R506205-05

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7293	Client/Case no <u>Hanford</u>	SDG H3246
Contact Melissa C. Mannion	Contract No. 630	
Lab sample id <u>R506205-05</u>	Client sample id Lab Control Sample	
Dept sample id 7288-005	Material/Metrix	SOLID
	SAF No F05-023	

ANALYTE	RESULT pci/g	20 ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TRST	ADDED pCi/g	2ø ERR pCi/g	REC %	3ø LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	680	15	5.4	400		н	720	29	94	84-116	80-120
Carbon 14	1570	32	6.7	50		С	1600	64	. 98	84-116	80-120
Total Strontium	N.A.			1.0		SR					80-120
Thorium 230	N.A.			1.0		TH					80-120
Total Uranium (ug/g)	N.A.			1.0		U_T					80-120
Oranium 233/234	N.A.			1.0		ט					80-120
Oranium 235	N.A.			1.0		U					80-120
Uranium 238	N.A.			1.0		ט					80-120
Neptunium 237	N.A.			1.0		NP					80-120
Plutonium 238	N.A.			1.0		PO	i				80-120
Plutonium 239/240	N.A.			1.0		ÞΩ					80-120
Americium 241	N.A.			1.0		AM					80-120
Iodine 129	N.A.			2.0		I					80-120

216A8 Crib Characterization Borehole

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	QC-LCS #53509		
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LAB CONTROL SAMPLES
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SAMPLE DELIVERY GROUP H3246

R506205-08

# LAB CONTROL SAMPLE

Lab Control Sample

SDG <u>7293</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> SDG H3246  Contract No. 630
Lab sample id <u>R506205-08</u> Dept sample id <u>7288-008</u>	Client sample id Lab Control Sample  Material/Matrix SAF No F05-023

ANALYTE	RESULT pCi/g	20 ERR	MDA pCi/g	RDL pC1/g	QUALI- FIRRS	TEST	ADDED pCi/g	2σ KRR pCi/g	RBC	30 LMTS (TOTAL)	PROTOCOL LIMITS
Technetium 99	110	2.9	0.66	15		TC	109	4.4	101	83-117	80-120

216A8 Crib Characterization Borehole

Q	C-LCS 5	<b>412</b> 3			

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SAMPLE DELIVERY GROUP H3246

R507031-05

#### LAB CONTROL SAMPLE

Lab Coutrol Sample

SDG 7293 Contact Melissa C. Mannion	Client/Case no <u>Hanford</u> SDS H3246  Contract No. 630
Lab sample id <u>R507031-05</u> Dept sample id <u>7293-005</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix SOLID  SAF NO F05-023

ANALYTR	RESULT pCi/g	2σ ERR (COUNT)	MDA pC1/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	RBC	3σ LMTS (TOTAL)	PROTOCOL LUMITS
Cobalt 60 Cesium 137	3.75 3.84	0.50	0.34	0.050	-	gam gam	3.31	0.13	113 112	65-135 68-132	ļ

216A8 Crib Characterization Borehole

QC-LCS #53670			

LAB CONTROL SAMPLES
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SAMPLE DELIVERY GROUP H3246

R507031-08

# LAB CONTROL SAMPLE

lab Control Sample

SDG 7293 Contact Melissa C. Mannion	Client/Case no <u>Hanford</u> <u>SDG H3246</u> Contract <u>No. 630</u>
Lab sample id <u>R507031-08</u>	Client sample id <u>Lab Control Sample</u>
Dept sample id 7293-008	Material/MatrixSOLIDSAF No F05-023

ANALYTE	RESULT pci/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	20 ERR pCi/g	REC	3σ LMTS (TOTAL)	PROTOCOL
Iodine 129	126	1.7	2.4	2,0		r	116	4.6	109	82-118	80-120

216A8 Crib Characterization Borehole

QC-LCS #54016		

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SAMPLE DELIVERY GROUP H3246

R507031-07

# DUPLICATE

B1D994

SDG <u>7293</u> Contact <u>Melissa C</u> .	Mannion	Client/Case no Hanford SDG H3246 Contract No. 630
DUPLICATE	ORIGINAL	
Lab sample id R507031-07	Lab sample id <u>R507031-03</u>	Client sample id B1D994
Dept sample id 7293-007	Dept sample id <u>7293-003</u>	Location/Marrix 216-A-8, I-7 SOLID
	Received 07/07/05	Collected/Weight <u>06/29/05 09:05</u> <u>146 g</u>
% solids _97,5	% solids 97.5	Custody/SAF No <u>F05-023-032</u> <u>F05-023</u>

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR	MDA pCi/g	QUALÎ- PIERS	RPD	3 o Tot	PROT LIMIT
Tritium	7.86	1.8	2.5	400		н	8.50	1.7	2,5		8	50	
Carbon 14	-0.526	1.6	2.8	50	ט	С	0	1.6	2.6	Ü	· -		
Iodine 129	-0.506	0.59	1.3	2.0	σ	ı	-0.146	0.51	1.2	Ü	-		
Potaesium 40	16.8	1.4	1.0			CLAM	17.4	3.1	2.1		4	44	
Cobalt 60	ס		0.12	0.050	U	GAM	τ		0.21	U	-		
Antimony 125	υ		0.21		U	GAM	۵		0.37	Ū	-		
Cesium 134	U		0.14		ט	MAD	σ		0.22	ט	-		
Cesium 137	σ		0.099	0.10	U	GAM	U		0.15	U	-		
Radium 226	0.488	0.17	0.18			GAM	0.617	0.34	0.36		23	108	
Radium 228	0.690	0.30	0.36			GAM	0.720	0.52	0.64		4	132	
Europium 152	υ		0.28	0.10	ט	GAM	υ		0.33	ט	-		
Europium 154	ט		0.37	0.10	ט	GAM	ט		0.54	ס	-		
Europium 155	ט		0.15	0.10	υ	GAM	ס		0.34	U	-		
Thorium 228	0.888	0.13	0.12			GAM	0.776	0.20	0.24		13	54	
Thorium 232	0.690	0.30	0.36			GAM	0.720	0.52	0.64		4	132	
Uranium 235	יט.		0.27		U	GAM	Ü		0.50	Ū	-		
Oranium 238	U		14		ט	GAM	ט		25	U	-		
Americium 241	Ū		0.091		U	GAM	υ		0.41	ם	-		

216A8 Crib Characterization Borehole

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SAMPLE DELIVERY GROUP H3246

R507031-10

#### DUPLICATE

B1D994

	7293 Melissa C. Mannion		Client/Case no Contract	
· •	DUPLICATE	ORIGINAL		
Lab sample id	R507031-10 Lal	sample id <u>R507031-03</u>	Client sample id	B1D994
Dept sample id	7293-010 Dept	t sample id <u>7293-003</u>	Location/Matrix	216-A-8, I-7 SQLID
		Received <u>07/07/05</u>	Collected/Weight	06/29/05 09:05 146 g
% solids	97.5	t solids <u>97.5</u>	Custody/SAF No	F05-023-032 F05-023

ANALYTE	DOPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	original.	20 ERR (COUNT)	MDA pCi/g	QUALI- PIERS	RPD	3σ PROT TOT LIMIT
Technetium 99	0.110	0.16	0.49	15	ט	TC	0.098	0.15	0.49	σ	-	

216A8 Crib Characterization Borehole

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Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 08/31/05

# EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP #3246

R507031-01

# DATA SHEET

B1D992

1	7293 Melissa C. Mannion	Client/Case no Contract		DG_H3246
	<del></del>	Client sample id Location/Matrix Collected/Weight Custody/SAF No	216-A-8, I-5 06/23/05 13:40 144	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	2.48	1.5	2.5	400	υ	Н
Carbon 14	14762-75-5	4.34	1.7	2.7	50		С
Technetium 99	14133-76-7	0.105	0.16	0.48	15	บ	TC
Iodine 129	15046-84-1	-0.211	0.43	0.97	2.0	U	I
Potassium 40	13966-00-2	15.0	1.6	1.0			GAM
Cobalt 60	10198-40-0	Ū		0.092	0.050	U	GAM
Antimony 125	14234-35-6	ט		0.19		υ	GAM
Cesium 134	13967-70-9	ប		0.11		U	GAM
Cesium 137	10045-97-3	U		0.084	0.10	U	GAM
Radium 226	13982-63-3	0.553	0.17	0.14			GAM
Radium 228	15262-20-1	0.688	0.31	0.38			GAM
Europium 152	14683-23-9	ט		0.19	0.10	ט	GAM
Europium 154	15585-10-1	บ		0.27	0.10	U	GAM
Europium 155	14391-16-3	υ		0.18	0.10	ប	GAM
Thorium 228	14274-82-9	0.884	0.14	0.14			GAM
Thorium 232	TH-232	0.688	0.31	0.38			GAM
Uranium 235	15117-96-1	U		0.26		υ	GAM
Uranium 238	U-238	Ü		10		U	GAM
Americium 241	14596-10-2	Ü		0.20		ប	GAM

216A8 Crib Characterization Borehole

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 08/31/05

# EBERLINE SERVICES/RICHMOND SAMPLE DELIVERY GROUP H3246

R507031-02

# DATA SHEET

B1D993

7293 Melissa C. Mannion	Client/Case no Contract		OG_H3246
	Client sample id Location/Matrix Collected/Weight Custody/SAF No	216-A-8, I-6 06/27/05 12:05 179 0	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pC1/g	QUALI- FIERS	TEST
Tritium	10028-17-9	4.68	2.1	3.4	400		н
Carbon 14	14762-75-5	-0.162	2.1	3.6	50	ប	C
Technetium 99	14133-76-7	-0.006	0.21	0.54	15	ט	TC
Iodine 129	15046-84-1	-0.967	0.98	2.2	2.0	ซ	I
Potassium 40	13966-00-2	10.7	0.97	0.63			GAM
Cobalt 60	10198-40-0	ŭ		0.065	0.050	υ	GAM
Antimony 125	14234-35-6	ש		0.15		ט	GAM
Cesium 134	13967-70-9	σ		0.084		$\mathbf{v}$	GAM
Cesium 137	10045-97-3	ש		0.060	0.10	ਹ	GAM
Radium 226	13982-63-3	0.272	0.11	0.11			GAM
Radium 228	15262-20-1	0.529	0.23	0.23			GAM
Europium 152	14683-23-9	ซ		0.18	0.10	U	GAM
Europium 154	15585-10-1	Ū		0.20	0.10	U	GAM
Europium 155	14391-16-3	Ū		0.17	0.10	Ū	GAM
Thorium 228	14274-82-9	0.686	0.12	0.10			GAM
Thorium 232	TH-232	0.529	0.23	0.23			GAM
Uranium 235	15117-96-1	υ		0.23		Ū	GAM
Uranium 238	บ-238	σ		7.3		ט	GAM
Americium 241	14596-10-2	U		0.21		Ū	GAM

216A8 Crib Characterization Borehole

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 EBRLNE

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 Hanford

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 Ver 1.0

 Form
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 Version
 3.06

 Report date
 08/31/05

# EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP H3246

R507031-03

# DATA SHEET

B1D994

7293 Melissa C. Mannion	Client/Case no Contract		SDG_H3246
	Client sample id Location/Matrix Collected/Weight Custody/SAF No	216-A-8, I-7 06/29/05 09:05 146	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	8.50	1.7	2.5	400		н
Carbon 14	14762-75-5	0	1.6	2.6	50	ΰ	С
Technetium 99	14133-76-7	0.098	0.16	0.49	15	U	TC
Iodine 129	15046-84-1	-0.146	0.51	1.2	2.0	U	I
Potassium 40	13966-00-2	17.4	3.1	2.1			GAM
Cobalt 60	10198-40-0	U		0.21	0.050	บ	GAM
Antimony 125	14234-35-6	Ū		0.37		Ü	GAM
Cesium 134	13967-70-9	U		0.22		U	GAM
Cesium 137	10045-97-3	U		0.15	0.10	ប	GAM
Radium 226	13982-63-3	0.617	0.34	0.36			GAM
Radium 228	15262-20-1	0.720	0.52	0.64			GAM
Europium 152	14683-23-9	Ū		0.33	0.10	U	GAM
Europium 154	15585-10-1	U		0.64	0.10	ប	GAM
Europium 155	14391-16-3	U		0.34	0.10	U	GAM
Thorium 228	14274-82-9	0.776	0.20	0.24			GAM
Thorium 232	TH-232	0.720	0.52	0.64			GAM
Uranium 235	15117-96-1	U		0.50		ប	GAM
Uranium 238	U-238	Ū		25		υ	GAM
Americium 241	14596-10-2	U		0.41		Ū	GAM

216A8 Crib Characterization Borehole

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# EBERLINE SERVICES / RICHMOND SAMPLE DELIVERY GROUP H3246

R507031-04

# DATA SHEET

**B1D995** 

7293 Melissa C. Mannion	Client/Case no Contract		SDG_H3246
	Client sample id Location/Matrix Collected/Weight Custody/SAF No	216-A-8, I-8 06/30/05 07:05 26	SOLID 1 q 023

ANALYTE	CAS NO	RESULT PCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	1.09	1.7	2.8	400	υ	H
Carbon 14	14762-75-5	-1.11	1.8	3.1	50	Ū	С
Technetium 99	14133-76-7	0.039	0.19	0.49	15	บ	TC
Iodine 129	15046-84-1	<u>-0.732</u>	0.66	1.5	2.0	ש	r
Potassium 40	13966-00-2	13.5	1.0	0.63			GAM
Cobalt 60	10198-40-0	ט		0.058	0.050	ט	GAM
Antimony 125	14234-35-6	U		0.11		U	GAM
Cesium 134	13967-70-9	ប		0.069		υ	GAM
Cesium 137	10045-97-3	ŭ		0.051	0.10	บ	GAM
Radium 226	13982-63-3	0.476	0.13	0.10			GAM
Radium 228	15262-20-1	0.805	0.23	0.24			GAM
Europium 152	14683-23-9	ט		0.11	0.10	U	GAM
Europium 154	15585-10-1	Ū		0.18	0.10	ט	GAM
Europium 155	14391-16-3	Ū		0.11	0.10	υ	GAM
Thorium 228	14274-82-9	0.801	0.089	0.090			GAM
Thorium 232	TH-232	0.805	0.23	0.24			GAM
Uranium 235	15117-96-1	Ü		0.17		U	GAM
Uranium 238	U-238	บ		6.4		U	GAM
Americium 241	14596-10-2	U		0.13		ט	GAM

216A8 Crib Characterization Borehole

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SAMPLE DELIVERY GROUP H3246

Test	TC Matrix SOLID
SDG	7293
Contact	Melissa C. Mannion

# METHOD SUMMARY

TECHNIETIUM 99 IN SOLIDS BETA COUNTING

Client	Hanford
Contract	No. 630
Contract	SDG H3246

RESULTS

LAB	RAW SUF	-	Technet	ium				
SAMPLE ID	TEST FIX	PLANCHET	99					
197								
R507031-01	A1	7293-001	ū					
R507031-02	A1	7293-002	υ					
R507031-03	Al	7293-003	σ					
R507031-04	Al	7293-004	τ					
R506205-09		7288-009	σ					
R506205-08		7288-008	ok					
R507031-10		7293-010	-	ס				
<del></del>				<del></del>				
s from metho	od R	Dis (pCi/g)	15					
ion Borchole	<u>:</u>							
	R507031-01 R507031-02 R507031-02 R507031-04 R507031-04 R506205-09 R506205-08 R507031-10	SAMPLE 1D TEST FIX  1.97  R507031-01 A1  R507031-02 A1  R507031-04 A1  R506205-09  R506205-08  R507031-10	R507031-01 A1 7293-001 R507031-02 A1 7293-002 R507031-03 A1 7293-003 R507031-04 A1 7293-004 R506205-09 7288-009 R506205-08 7288-008 R507031-10 RDLs (pCi/g)	### SAMPLE ID   TEST FIX   PLANCHET   99  1.97  #### R507031-01   A1   7293-001   U   #### R507031-02   A1   7293-002   U   #### R507031-03   A1   7293-003   U   #### R507031-04   A1   7293-004   U   #### R506205-09   7288-009   U   #### R506205-08   7288-008   Ok   #### R507031-10   7293-010   -	R507031-01 A1 7293-001 U R507031-02 A1 7293-002 U R507031-03 A1 7293-003 U R507031-04 A1 7293-004 U R506205-09 7288-009 U R506205-08 7288-009 U R507031-10 7293-010 - U	SAMPLE ID TEST FIX PLANCHET 99  1.97  R507031-01 A1 7293-001 U  R507031-02 A1 7293-002 U  R507031-03 A1 7293-003 U  R507031-04 A1 7293-004 U  R506205-09 7288-009 U  R506205-08 7288-008 ok  R507031-10 7293-010 - U  Es from method RDLs (pCi/g) 15	SAMPLE ID TEST FIX PLANCHET 99  1.97  R507031-01 A1 7293-001 U  R507031-02 A1 7293-002 U  R507031-03 A1 7293-003 U  R507031-04 A1 7293-004 U  R506205-09 7288-009 U  R506205-08 7288-008 ok  R507031-10 7293-010 - U  Es from method RDLs (pCi/g) 15	R507031-01 A1 7293-001 U R507031-02 A1 7293-002 U R507031-03 A1 7293-003 U R507031-04 A1 7293-004 U R506205-09 7288-009 U R506205-08 7288-008 ok R507031-10 7293-010 - U

#### METHOD PERFORMANCE

	LAB			DA ALIC			ALETD							ANAL-	
CLIENT SAMPLE ID	SAMPLE ID	TEST I	TX pCi	./g <b>g</b>	PA:	TION	ŧ	*	min	keV	KeV	HBLD	PREPARED	YZED	DETECTOR
Preparation batch 7132-		ep erre	r 10.0 1	Referenc	e Lab	Noteboo	k 7132	pg.	197						
81D992	R507031-01	1	<b>1</b> 0.	48 1.13	}		94		50			65	08/24/05	08/27	GRB-222
B1D993	R507031-02	1	u 0.	54 1.04	Ł		90		50			61	08/24/05	08/27	GRB-223
B1D994	R507031-03	2	1 0.	49 1.11	L		92		50			59	08/24/05	08/27	GRB-224
B1D995	R507031-04	2	u 0.	49 1.14	1		92		50			60	08/24/05	08/29	GRB-217
BLK (QC ID=54124)	R506205-09		0.	54 1.00	)		98		50				08/24/05	08/27	GRB-227
LCS (QC ID=54123)	R506205-08		0.	66 1.00			97		50				08/24/05	08/27	GRB-226
Duplicate (R507031-03)	R507031-10		0.	49 1.13	1		91		50			59	08/24/05	08/27	GRB-222
(QC ID=54127)															
Nominal values and limit	ts from metho	xd.	15	1.00	)		20-10	5	50	_		180			

PROCEDURES	REFERENCE	TC99_TR_SEP_LSC
	SPP-071	Soil Dissolution, > 1.0g Aliquot, rev 5
	CP-431	Technetium-99 Purification of Soil or Resin by
		Extraction Chromatography, rev 2
	CP-008	Heavy Element Electroplating, rev 9

AVERAGES ± 2 SD	MDA 0.53 ± 0.13	
FOR 7 SAMPLES	YIELD 93 + 6	

METHOD SUMMARIES

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SAMPLE DELIVERY GROUP H3246

Test GAM Matrix SOLTD

SDG 7293

Contact Melissa C. Mannion

#### METHOD SUMMARY

gamma scan

GAMMA SPECTROSCOPY

Client	Hanford
Contract	No. 630
Contract	SDG H3246

#### RESULTS

	LAB	RAW SUF-				
CLIENT SAMPLE ID	SAMPLE ID	TEST FIX	PLANCHET	Cobalt 60	Cesium	137
Preparation batch 7132-	197				_	
B1D992	R507031-01		7293-001	ט	Ū	
B1D993	R507031-02		7293-002	ד	U	
B1D994	R507031-03	•	7293-003	ם	U	
B1D995	R507031-04		7293-004	Ū	Ü	
BLK (QC ID=53671)	R507031-06		7293-006	Ū	U	
LCS (QC ID=53670)	R507031-05		7293-005	ok	ok	
Duplicate (R507031-03)	R507031-07		7293-007	- <b>v</b>	-	σ
		<u> </u>				
Nominal values and limi	ts from metho	od RI	Nas (pCi/g)	0.050	0.10	
216A8 Crib Characteriza	tion Borebole	:				

#### METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	ran Test	SUF- FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU- TION	\$ Aleid					PRRPARED	anal-	DETECTOR
						7.45.		k 7120		107	 				
Preparation batch 7132-1		ep er		5.0 % Re		THEORE IS	OCEDOO:	K /132	Þa.				07/03/05	00/12	DD 02 00
B1D992	R507031-01			0.67	67.2					499			07/23/05		
B1D993	R507031-02			0.54	66.4					498		46	07/23/05	08/12	PD,04,00
B1D994	R507031-03			1.5	64.8					146		57	07/23/05	08/25	PD,03,00
B1D995	R507031-04			0.49	81.0					937		48	07/23/05	08/17	PD,03,00
BLK (QC ID=53671)	R507031-06			0.38						405			07/23/05	08/16	PD,04,00
LCS (QC ID=53670)	R507031-05			0.34	64.0					101			07/23/05	08/29	PD,03,00
Duplicate (R507031-03)	R507031-07			0.90	64.B					405		48	07/23/05	OB/16	PD,07,00
(QC ID=53672)											 		··· ——		
Nominal values and limit	se from metho	rd.		0.050	64.0					100		180			

PROCEDURES	REFERENCE SPF-061	GAMMA_GS Determination of Moisture Content in Solid Samples
	SPP-100	rev 0 Ge(Li) Preparation for Commercial Samples, rev 7

AVERAGES ± 2 SD MDA 0.69 ± 0.81

FOR 7 SAMPLES YIELD \_\_\_\_\_ ± \_\_\_\_\_

METHOD SUMMARIES

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 Lab id
 EBRLNE

 Protocol
 Hanford

 Version
 Ver 1.0

 Form
 DVD-CMS

 Version
 3.06

 Report date
 08/31/05

SAMPLE DELIVERY GROUP H3246

Test	I Matrix SOLID
SDG	7293
Contact	Melissa C. Mannion

#### METHOD SUMMARY

IODINE 129 IN SOLIDS
GAMMA SPECTROSCOPY

Client	Hanford					
Contract	No. 630					
Contract	SDG H3246					

#### RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUF- TEST FIX	PLANCHET	Iodine	129			
Preparation batch 7132-	197B		·- <u>-</u>				 	 
B1D992	R507031-01		7293-001	Ū				
B1D993	R507031-02		7293-002	ט				
B1D994	R507031-03		7293-003	υ				
B1D995	R507031-04		72 <del>9</del> 3-004	U				
BLK (QC ID=54017)	R507031-09		7293-009	υ				
LCS (QC ID=54016)	R507031-08		7293-008	ok		•		
Duplicate (R507031-03)	R507031-07		7293-007	_	U			

# METHOD PERFORMANCE

	LAB	RAW	SUF-	DA AL10	PRRP	DILU-	YIRLD	EFF	COUNT	FWHM	DRIFT	DAYS		ANAL-	
CLIENT SAMPLE ID	SAMPLE ID	TEST	FIX pC:	./g <b>g</b>	PAC	TION	*	¥	uin_	keV	KeV	HELLD	PREPARED	YZED	DETECTOR
Preparation batch 7132-	197Β 2σ	prep er	ror 10.0 t	Reference	Lab	Notebooi	7132	pg.	197						
B1D992	R507031-0	1	0.	97 1.00			66		820			55	08/17/05	08/17	X8PEC-004
B1D993	R507031-0	2	_ 2	2 1.00			64		762			51	08/17/05	08/17	XSPEC-016
B1D994	R507031-0	3	1.	2 1.00			73		603			50	08/17/05	08/18	XSPEC-002
B1D995	R507031-0	4	1.	5 1.00			57		602			49	08/17/05	08/18	XSPEC-004
BLK (QC ID=54017)	R507031-0	9	1.	1 1.00			64		812				08/17/05	08/1B	XSPEC-004
LCS (QC ID=54016)	R507031-0	В	2	4 1.00			66		813				08/17/05	08/18	XSPEC-002
Duplicate (R507031-03)	R507031-0	7	1.	3 1,00			58		675			51	08/17/05	08/19	ESPEC-004
(QC ID=53672)															
Nominal values and limit	s from met	nod	2.	0 1.00			20-10	5	300	_		180			<del></del>

		· · · · · · · · · · · · · · · · · · ·
PROCEDURES	REFERENCE	Il29_SEP_LEPS_GS
	SPP-062	Sample Aliquoting, rev 0
'	CP-024	Iodine-129, Sample Dissolution, rev 5
	CP-530	Todine-129 Purification, rev 1

AVERAGES ± 2 SD MINA 1.5 ± 1.1

FOR 7 SAMPLES YIELD 64 ± 11

METHOD SUMMARIES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3246

Test	<u>C</u>	tri	SOLID_
SDG	7293		
Contact	<u>Melissa</u>	c.	Mannion

#### METHOD SUMMARY

CARBON 14 IN SOLIDS

LIQUID SCINTILLATION COUNTING

Client	Hani	ford	
Contract	No.	630	
Contract	SDG	H3246	

#### RESULTS

	LAB	RAW SUF-				
CLIENT SAMPLE ID	SAMPLE ID	TEST FIX	PLANCHET	Carbo	14	
Preparation batch 7132-	197					-
B1D992	R507031-01		7293-001	4.34		
B1D993	R507031-02		7293-002	σ		
B1D994	R507031-03		7293-003	U		
B1D995	R507031-04		7293-004	Ū		
BLK (QC ID=53510)	R506205-06		7288-006	ס		
LCS (QC TD=53509)	R506205-05		7288-005	ok		
Duplicate (R507031-03)	R507031-07		7293-007	-	τ	

# METHOD PERFORMANCE

	LAB	RAW	SUF- MOA	OLIA	PREP	DILU-	Alkid	eff	COUNT	FWHM	DRIFT	DAYS		ANAL-	
CLIENT SAMPLE ID	SAMPLE ID	TEST	FIX pC1/g	ı g	FAC	TION	*	1	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR
Preparation batch 7132-	197 <b>2σ p</b> r	ep err	or 10.0 %	Reference	Lab	Notebool	× 7132	pg.	197			<u>-</u>		_	
B1D992	RS07031~01		2.7	0.484			100		50			36	07/28/05	07/29	LSC-005
B1D993	R507031-02		3.6	0.358			100		50			32	07/28/05	07/29	LSC-005
B1D994	R507031-03		2.6	0.488			100		50			30	07/28/05	07/29	LSC-005
B1D995	R507031-04		3.1	0.427			100		50			29	07/28/05	07/29	LSC-005
BLK (QC ID=53510)	R506205-06		3.2	0.400			100		50				07/28/05	07/28	LSC-005
LCS (QC ID=53509)	R506205-05		6.7	0.400			100		11				07/28/05	07/29	LSC-005
Duplicate (R507031-03)	R507031-07		2.8	0.459			100		50			30	07/28/05	07/29	LSC-005
(QC ID=53672)															
Nominal values and limit	ts from metho	ođ	50	0.400					25			180			

İ	PROCEDURES	REFERENCE	C14_COX_LSC
		CP-251	Tritium/Carbon-14 Oxidation, rev 8
-			

AVERAGES ± 2 SD	MDA	3.5	±	2.9
FOR 7 SAMPLES	AIETD	100	±	

METHOD SUMMARIES

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 Lab 1d
 EBRLNE

 Protocol
 Hanford

 Version
 Ver 1.0

 Form
 DVD-CMS

 Version
 3.06

 Report date
 08/31/05

SAMPLE DELIVERY GROUP H3246

Test	<u>H</u>	Matrix	SOLID
SDG	7293		
Contact	Meli.	ssa C.	Mannion

#### METHOD SUMMARY

TRITIUM IN SOLIDS
LIQUID SCINTILLATION COUNTING

Client	Hanford
Contract	No. 630
Contract	SDG H3246

RESULTS

CLIENT SAMPLE ID	SAMPLE ID	TEST FIX P	LANCHET	Tritium		
Preparation batch 7132-	197				 	
B1D992	R507031-01	7:	293-001	σ		
B1D993	R507031-02	7	293-002	4.68		
B1D9 <b>94</b>	R507031-03	7.	293-003	8.50		
B1D995	R507031-04	7.	293-004	ס		
BLK (QC ID=53510)	R506205-06	7:	288-006	ט		
LCS (QC ID-53509)	R506205-05	7.	288-005	ok		
Duplicate (R507031-03)	R507031-07	7	293-007	ok		

# METHOD PERFORMANCE

	LAB	RAW	SUF- ME	QILIA A	PREP	DILU-	YIELD	epp	COUNT	FWHM	DRIFT	DAYS		ANAL-	
CLIENT SAMPLE ID	SAMPLE ID TEST	TEST	TEST FIX pCi/g	Ci/g g	FAC TION	ŧ	*	min	keV	<b>Ke</b> V	HEID	PREPARED	YZED	DETECTOR	
Preparation batch 7132-	197 2 <i>0</i> pr	ep err	or 10.0 %	Reference	Lab	Not eboo	k 7132	pg.	197						
B1D992	R507031-01		2.5	0.484			100		120			36	07/28/05	07/29	LSC-004
B1D993	R507031-02		3.4	0.358			100		120			33	07/28/05	07/30	LSC-004
B1D994	R507031-03		2.5	0.488			100		120			31	07/28/05	07/30	LSC-004
B1D995	R507031-04		2.8	0.427			100		120			30	07/28/05	07/30	LSC-004
BLK (QC ID=53510)	R506205-06		3.0	0.400			100		120				07/28/05	07/29	LSC-004
LCS (OC ID=53509)	R506205-05		5.4	0.400			100		37				07/28/05	07/30	LSC-004
Duplicate (R507031-03)	R507031-07		2.6	0.459			100		120			31	07/28/05	07/30	LSC-004
(QC ID=53672)															
Nominal values and limit	s from metho	od.	400	0.400					25			190			<u></u>

PROCEDURES	REFERENCE	TRITIUM_COX_LSC
	CP-251	Tritium/Carbon-14 Oxidation, rev 8

AVERAGES ± 2 SD	MDA 3.2 ± 2.1_
FOR 7 SAMPLES	YIELD 100 ± 0

METHOD SUMMARIES

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Lab id EBRLNB
Protocol Hanford
Version Ver 1.0
Porm DVD-CMS
Version 3.06
Report date 08/31/05

SAMPLE DELIVERY GROUP H3246

SDG 7293
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hanford
Contract	No. 630
Case no	SDG_H3246

#### SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

\* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3246

SDG	7293			
Contact	<u>Melissa</u>	c.	<u>Mannion</u>	

#### REPORT GUIDE

Client	Hani	ford	
Contract	No.	630	
Case no	SDG	H3246	

#### PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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SAMPLE DELIVERY GROUP H3246

SDG 7293
Contact Melissa C. Mannion

REPORT GUIDE

Client	Hanford
Contract	No. 630
Case no	SDG_H3246

#### WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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SAMPLE DELIVERY GROUP H3246

SDG 7293 Contact Melissa C. Mannion

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#### DATA SHERT

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3246

SDG	<u>7293                                    </u>		
Contact	Melissa	C.	Mannion

GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H3246

#### DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

\* An MDA is underlined if it is bigger than its RDL.

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SAMPLE	DELIVERY	GROUP	H3246	

SDG	7293			
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GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H3246

#### DATA SHEET

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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SAMPLE DELIVERY GROUP H3246

SDG	<u>7293</u>	
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REPORT GUIDE

Client	Hanford
Contract	No. 630
Case no	SDG H3246

#### LAE CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  - 1. The error of RESULT, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

- 2. The error of ADDED.
- 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

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SAMPLE DELIVERY GROUP H3246

SDG 7293
Contact Melissa C. Mannion

REPORT GUIDE

Client <u>Hanford</u> Contract <u>No. 630</u> Case no <u>SDG H3246</u>

#### DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

\* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

\* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

\* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:
  - 1. A fixed percentage specified in the protocol.

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 Lab id
 EBRLNE

 Protocol
 Hanford

 Version
 Ver 1.0

 Form
 DVD-RG

 Version
 3.06

 Report date
 08/31/05

SAMPLE DELIVERY GROUP H3246

SDG	7293		
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GUIDE, cont.

Client	Hanford
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Case no	SDG_H3246

### DUPLICATE

- 2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.
- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

\* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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SAMPLE DELIVERY GROUP H3246

SDG	<u> 7293                                     </u>		
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REPORT GUIDE

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Contract	No. 630
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#### MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.
  - If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.
- \* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.
  - An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.
- \* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  - 1. The errors of the two RESULTs, including those introduced by rounding them prior to printing.
    - If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  - 2. The error of ADDED.
  - 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits

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SAMPLE DELIVERY GROUP H3246

SDG 7293 Contact Melissa C. Mannion

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Client	Hanford
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### MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

\* The recovery is underlined (out of spec) if it is outside either of these ranges.

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O N MOT. IF	DELIVERY		ロマウムム
	TAPLITABLE	GROUP	D3230

SDG 7293
Contact Melissa C. Mannion

## REPORT GUIDE

Client	Han:	ford
Contract	No.	630
Case no	SDG	H3246

#### METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

\* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

\* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

\* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H3246

SDG	7293		
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Client	Hanford
Contract	No. 630
Case no	SDG_H3246

## METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- \* Aliquots are underlined if less than the nominal value specified for the method.
- \* Prepareation factors are underlined if greater than the nominal value specified for the method.
- \* Dilution factors are underlined if greater than the nominal value specified for the method.
- \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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SAMPLE DELIVERY GROUP H3246

SDG 7293
Contact Melissa C. Mannion

GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H3246

### METHOD SUMMARY

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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Lab id <u>EBRLNE</u>

Protocol <u>Hanford</u>

Version <u>Ver 1.0</u>

Form <u>DVD-RG</u>

Version <u>3.06</u>

Report date <u>08/31/05</u>

SAMPLE DELIVERY GROUP H3246

SDG	729 <u>3</u>			
ontact	Melissa	C.	Mannion	

GUIDE, cont.

Client	Hanford
Contract	No. 630
Case no	SDG_H3246

### METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

REPORT GUIDES
Page 15
SUMMARY DATA SECTION
Page 41

	Fluor	Hanford Inc.		CHAIN C	F CUSTODY	/SAMPLE ANAL	/SIS R	EQUEST	F05-023-030	PAGE 1 OF 1		
COLLECTOR Pope/Pfister/M	lokler/Wels/T	yra	COMPANY CONT TRENT, SJ	ACT		PHONE NO. 3-5869		PROJECT COORDINATOR TRENT, SJ	PRICE CODE BN	DATA TURNAROUND		
AMPLING LO 216-A-8, 1-5		_	PROJECT DESIG 216-A-8 Crib Cha	NATION	hoto H.32	46 (72	13)	SAF NO. F05-023	AIR QUALITY	45 Days / 45 Days		
CE CHEST NO		1/1/	PIELD LOGBOOK			COA		METHOD OF SHIPMENT FEDERAL EXPRESS				
	(100	<u>'Ulu</u>	HNF-N-336-1	May May		119152E510		<b>,</b>	NO			
HIPPED TO Eberline Service	ces		OFFSITE PROPE	WITR	158	49		BILL OF LADING/AIR BULL	C 15844	y		
MATRIX*	POSSIBL	E SAMPLE HAZARDS/ REMARKS	PRESER	NOITAV	None							
L=Drum quids S=Drum	21_	L. L. BunOXI	TYPE OF C	DNTAINER	G/P							
olids =Liquid =Oil =Soil	700	huto BW987	No. of CON	ITAINER(S)	1							
E=Sediment =Tissue /=Vegitation Y=Water			AOF	UME	120mL							
VI≃Wipe <=Other	SPECIAL	HANDLING AND/OR STORAGE	SAMPLE A	MALYSIS	SEE ITEM (L) IN SPECIAL INSTRUCTIONS							
SAMPI	LE NO.	HATRIX*	SAMPLE DATE	SAMPLE TIME								
1D992		SOIL	423/09	1340	X							
							<del></del>					
			<u></u>									
			<u> </u>		<u> </u>					<u>_ l</u>		
CHAIN OF PO	OSSESSION		SIGN/ PRIN	TNAMES				special instructions (1)Carbon-14; Neptunkum-237;	Gamma Snec - Redinm-(F	Indium 226, Radium 2281		
RELINQUISHE LLLUE RELINQUISME	ED BY/REMOV	ED EROM DATE/TIME    6/23/05 / 5/(C)   ED EROM   1/1 CORTE/TIME	RECEIVED BY	STORED IN	43 6/2	DATE/TIP 9/05/5/ 7/04/EUTA	0	Indine-129; Isotopic Thorium (	Thorium 232) Technetium WBB 6/6/05	-99; Tritium - H3;		
NATING SHE		3,7/0/05 013:	RECEIVED BY	STORED IN	MINU	DATE/TIN	(25)					
RELINQUISHE	ED BY/REMOV		RECEIVED BY			0.1/01E/11	E 3/1					
RELINQUISHE		07 07 05 VED FROM DATE/TIME	RECEIVED BY			DATE/TI						
RELINQUISHE	EO BY/REMO\	/ED FROM DATE/TIME	RECEIVED BY	STORED IN		DATE/TIP	E					
RELINQUISHE	ED BY/REMO	VED FROM DATE/TIME	RECEIVED BY	STORED IN		DATE/TIS	IE					
LABORATO SECTIO	ORY RE	CETYED BY	<u></u>				<u> </u>	TITLE		DATE/TIME		
FINAL SAM		SPOSAL METHOD						DISPOSED BY		DATE/TIME		

	Fluor Hanford Inc. CH			CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						F05-023-031		PAGE 1	OF 1	
OLLECTOR Pope/Pfister/I	Molder/Weis/T		COMPANY CON TRENT, SJ	ITACT		EPHONE NO 73-5869		PROJECT (	COORDINATO	OR	PRICE CODE 8N		DATA TÜRNAROUND 45 Days /	
MPLING L			PROJECT DESI	GNATION paracterization Bore	hole H	3246	(7293)	<b>SAF NO. F0</b> 5-023			AIR QUALITY	[_]		Days Days
E CHEST N	10 . 44	B-U19	FIELD LOGBOO HNF-N-336-1	OK NO.		COA 119152ES1	0	METHOD OF SHIPMENT FEDERAL EXPRESS				•		
IPPED TO	<u> </u>	<i>))</i>	OFFSITE PROF		158	714		BILL OF L	ADING/AIR	11/1	15844			
		E SAMPLE HAZARDS/ REMARKS	PRESE	RVATION	None	<del>1</del>		<del>                                     </del>	Zu r		1 70 (			<u> </u>
ir Drum Ids Drum	21	Fact to BIDISS		CONTAINER	G/P			<u>                                     </u>	-					<b>†</b>
ls quid Xii	17aci 71			NTAINER(S)	1				<del> </del>		<u>·</u>			
S=Soil SE=Sediment T=Tissue V=Vegitation W=Water WT=Wipe X=Other			vo	LUME	120mL									
	SPECIAL	. HANDLING AND/OR STORAGE	SAMPLE	SAMPLE ANALYSIS		N S							-	
SAMP	PLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME										
993		SOIL	6/22/5	1205	X									
				<u> </u>								_		<u> </u>
	·····													_
	OSSESSION		SIGN/ PRI	NT NAMES			SPI	ECIAL INST	RUCTIONS	. l		<u> </u>		- İ
	ED BY/REMOV		RECEIVED BY		Buch	423 11100	TIME (1)	)Carbon-14; dine-129; Is	; <del>Nepturlam</del> <del>sotopic Theri</del>	- <del>23</del> 7; G <del>um (∏</del> • <b>∨∤}∂</b>	amma Spec - Ra <del>orium 232</del> } Tec <b>U(U(O</b> S	<del>dium (Re</del> hnetium-9	<del>sdium 226, Ra</del> 99; Tritlum - H	<del>dium-2</del> 28)  3;
LINQUISHI ELINQUISHI		PATE/TIME	RECEIVED B	<del>i</del> M	07/07	65 3	/TIME // )/D /TIME							
LINQUISH	ED BY/REMOV	PED FROM DATE/TIME	RECEIVED B	Y/STORED IN		DATE	/TIME							
	ED BY/REMOV		RECEIVED B	Y/STORED IN		DATE	/TIME	<u> </u>				<del></del> _		
ABORAT	ORY REC	CEIVED BY	· · <del> · -</del>				TIT	TLE					OATE/TIME	
SECTIO	)N													

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQ					QUEST		F05-023-032		PAGE 1 OF 1	
OLLECTOR  Pope/Pfister/Mokler/Wels/Tyra		COMPANY CONT TRENT, SJ	ACT		L <b>EPHONE</b> N 373-5869	10.	PROJECT TRENT, S	COORDINATOR	PRICE CODE	8N	DATA TURNAROUND	
AMPLING LOCATION 16-A-8, I-7		PROJECT DESIG		hole #3	246	(7293)	SAF NO. F05-023		AIR QUALITY		45 Days / 45 Days	
E CHEST NO - ()		FIELD LOGBOOK HNF-N-336-1	NO.		119152ES10		METHOD OF SHIPMENT FEDERAL EXPRESS					
DIPPED TO berline Services		OFFSITE PROPERTY NO		15844		<u> </u>	BILL OF L	ADING/AIR BILL	1 15844			
MATRIX* POSSIBLE SAMPLE HAZARDS/ REMARKS		PRESER	MOITAY	None								
Forum Had tutof	31D489	TYPE OF CONTAINER		G/P								
inionionionionionionionionionionionionio		NO. OF CON		1 120mL								
-Wagation  -Water  -Wipe  -Other   SPECIAL HANDLING A	AND/OR STORAGE	SAMPLE A		SEE ITEM (1) I SPECIAL INSTRUCTION	ļ							
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME				3					
D994 SOIL		4/29/5	0905	×						-		
										<del> </del>		
HAIN OF POSSESSION		SIGN/ PRINT	NAMES	-L	<del></del>	SP	ECIAL INST	RUCTIONS		<del></del>		
RELINQUISHED BY/REMOVED FROM  VELINGUISHED BY/REMOVED FROM  HITHOUISHED BY/REMOVED FROM  RELINGUISHED BY/REMOVED FROM  THE CONTRACT OF THE PROPERTY OF THE PRO	DATE/TIME  24/05 //3  DATE/TIME  DATE/TIME  DATE/TIME	RECEIVED BY/	FEIDA STORED IN STORED IN	BUNG BUNG	74403 DAT	E/TIME (1 lo	)Carbon-14 dine-129; Is	; <del>Neptunium 237</del> ; sotopia Thorium MAB (/	( <del>Thorlum-232</del> ) Ted	<del>dium (Ra</del> nnetium-9	<del>dium 226, Radium 220</del> } 99; Tritium - H3;	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY			·	E/TIME						
RELINQUISHED BY/REMOVED FROM DATE/TIME  RELINQUISHED BY/REMOVED FROM DATE/TIME		RECEIVED BY/STORED IN  RECEIVED BY/STORED IN				E/TIME E/TIME						
LABORATORY RECEIVED BY				<del></del>			TLE				DATE/TIME	
SECTION  FINAL SAMPLE DISPOSAL METHOD DISPOSITION	<u></u>					<u>D</u> I	SPOSED BY		····		DATE/TIME	

	Fluor Hanford Inc. CHAIN OF CUSTODY/SAMPLE ANAL						PLE ANALYSIS REQUEST F05-023-033 PAGE					1 0	F 1				
COLLECTOR Pope/Pfister/i	Mokler/W	els/Tyra	COMPANY CONTRENT, 53	TACT		EPHONE N 373-5869	0.	PROJECT	COORDINATOR	PRICE (	CODE 8N	1	DATA				
SAMPLING L 216-A-8, 1-		N -	PROJECT DESIG		tole H3	246	(7293)	SAF NO. F05-023		AIR QU	ALITY 📋		45 Day		k je		
ICE CHEST N	1010	13-018	FIELD LOGBOOM			COA 119152ES	10	METHOD OF SHIPMENT FEDERAL EXPRESS					— <del>9</del> :	54~			
SHIPPED TO Eberline Serv	<u>.u</u>	<i></i>	OFFSITE PROP	RTY 110.	5740	/		BILL OF	LADING/AIR 41	11/15	744						
MATRIX* A=Air	POSS	IBLE SAMPLE HAZARDS/ REMARKS	PRESER	VATION	None					10 101	, ,						
DL=Drum Uquids DS=Drum Solids			TYPE OF C	TYPE OF CONTAINER		TYPE OF CONTAINER											
L=Liquid O=Oli S=Soli SE=Sediment T=Tissue	ļ			NTAINER(S)	1 120mL												
V=Vegitation W=Water WI=Wipe X=Other	SPE	CIAL HANDLING AND/OR STORAGE	SAMPLE (	ANALYSIS	SEE ITEM (1) I SPECIAL INSTRUCTIONS	1											
SAME	PLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME		,								era era			
B1D995		SOIL.	6/30/5	6705	X												
3 Mark	4																
CHAIN OF P	OSSESS	ION	SIGN/ PRIN	T NAMES			1	SPECIAL INS							-		
RELINQUISH RELINQUISH RELINQUISH	ED BY RE	HOVED FROM   DATE/TIME  AUG 6/30/5 C935  GOVED FROM   JOS 0130  TO	RECEIVED BY	STORED IN	3-15 (	130/5	E/TIME -09\$7 E/TIME E/TIME	(1)Carbon-14 (odine-129; )	I <del>solopic Therlun</del>	37; Gamma Sp 1 (Therlum 23 3 ししし	ec - <del>Rodium (Ru</del> 2) Technetium-	<del>sdium-22</del> 99; Tritiu	<del>o, Radiu</del> m - H3;	n <del>-228)</del>			
_ Fe	) t	MOVED FROM  OT  OT  OT  OT  OT  OT  OT  OT  OT	RECEIVED BY	М		07 07 01	E/TIME 5 9:70 E/TIME										
RELINQUISHED BY/REMOVED FROM DATE/TIME RECEIVED BY/STOR						E/TIME								O			
			STORED IN		DAT	E/TIME								]     			
LABORATO SECTIO		RECEIVED BY		Processing the Proceedings of the Processing of				TITLE				DATE/T	IME		0000048		
FINAL SAMPLE DISPOSAL METHOD DISPOSITION					DISPOSED BY				DATE/T	IME							



# RICHMOND, CA LABORATORY

## SAMPLE RECEIPT CHECKLIST

	-LUOR	HANFOYD	CityP4	CHLAND	State	<u>, WA</u>	
Date/Time rec	eived 07/47	105 9:20 coc	Chy	- 023 - 0	30,031	032,0	33)
Container I.D.	No. GHP 13	-01 & Reques	ted TAT (Days) 4	7 P.O. Recei	ved Yes	[] No[]	
			INSPECTIO	ON			
1. Custo	dy sezis an sh	nipping contains	er intact?		Yes [X]	No[] N	/A [ ]
2. Custo	dy seals on sh	nipping contains	er dated & signed?		Yes [Y]	No[] N	/A [ -]
3. Custo	dy seals on sa	ample container	s intact?		Yes [X]	No ( ) N	/A [ ]
4. Custo	dy seals on sa	emple container	s dated & signed?		Yes [🔨]	No[] N	/A [ ]
	ng material is:			_	Wet [V]	Dry[ ]	
6. Numb	er of samples	in shipping can	tainer:4	Sample Matrix	<u> </u>		
7. Numb	er of container	rs per sample:	(	Or see CoC	)		
8. Sampl	les are in com	ect container	•	res [X] No	[ ]		
'	work agrees w	•	`	res[x] No	[ ]		
10. Samp	ies have: Ta	ape [ ] Haza	rd tabels [ ] Rad	labels [ ] Appr	oonate sar	nole labels (	$\prec$ 1
11. Sampl	les are: in	good condition	[ Leaking [	] Broken Con	rtainer [ ]	Missing [	]
12. Samp	les ara: Pres	erved [ ] No	t preserved [ ] pH	Presen	rative		
13. Descr	ibe any anoma	alies:					
					Die		
	_	of any anomalie	1.				
	P.M. notified c	•	s? Yes [ 		Date		
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	woe
15. Insper	_	•	Date: 07/0	7/05 Time: _			wipe
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	wipe
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	wide
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	wide
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	wipe
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	wide
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	wipe
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	wipe
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	WiDe
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	Wide
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	wipe
15. Insper	cted by	FM	Date: 07 0	7/05 Time:	10:15	<u> </u>	wide
15. Inspec	cted by	mR/hr	Date: 07/0 Wipe	7/05 Time:	GD S/S	mR/hr	Wide
15. Insper	cted by	mR/hr	Date: 070	7/05 Time:	GD S/S	mR/hr	wipe

Form SCP-01.2, 01-23-04

"over 55 years of quality nuclear services"



Mr. Steve Trent Fluor Hanford Inc. 825 Jadwin Ave. Richland, WA 99352

Subject: Contract No. 630
Analytical Data Package

Dear Mr. Trent:



Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLl Batch #	0507L899
SDG#	H3246
SAF#	F05-023
Date Received	<b>7-</b> 07-05
# Samples	4
Matrix	Soil
Volatiles	
Semivolatiles	
Pest/PCB	
DRO/GRO/KRO	
Herbicides	
GC Alcohol	
Metals	
Inorganics	X

The electronic data deliverable (EDD) will be emailed shortly. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory Incorporated

Örlette S. Johnson Project Manager

r:\group\pm\orlette\tnu-hanford\data\fc\_ltrs.doc

# Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F05-023 H3246

DATE RECEIVED: 07/07/05 LVL LOT # :0507L899

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B1D992						
% SOLIDS	001	S	05L%S090	06/23/05	07/08/05	07/08/05
CHROMIUM VI	001	S	05LVI044	06/23/05	07/11/05	07/11/05
NITRATE NITRITE	001	S	05LN3A36	06/23/05	07/11/05	07/12/05
NITRATE NITRITE	001 REP	S	05LN3A36	06/23/05	07/11/05	07/12/05
NITRATE NITRITE	001 MS	s	05 <b>LN3A</b> 36	06/23/05	07/11/05	07/12/05
TOTAL ORGANIC CARBON	001	S	05LTZ053	06/23/05	07/21/05	07/21/05
TOTAL ORGANIC CARBON	001 REP	s	05LTZ053	06/23/05	07/21/05	07/21/05
TOTAL ORGANIC CARBON	001 MS	S	05LTZ053	06/23/05	07/21/05 07/13/05	07/21/05 07/14/05
OIL & GREASE BY GRAV	001	S	05L0G033	06/23/05	07/21/05	07/21/05
TOTAL INORGANIC CARB	001	S	05LTZA53	06/23/05 06/23/05	07/21/05	07/21/05
TOTAL INORGANIC CARB	001 REP	8	05LTZA53	06/23/05	07/21/05	07/21/03
B1D993						
% SOLIDS	002	s	05L%S090	06/27/05	07/08/05	07/08/05
CHROMIUM VI	002	s	05LVI044	06/27/05	07/11/05	07/11/05
NITRATE NITRITE	002	S	05LN3A36	06/27/05	07/11/05	07/12/05
TOTAL ORGANIC CARBON	002	s	05LTZ053		07/21/05	07/21/05
OIL & GREASE BY GRAV	002	s	05LOG033	06/27/05	07/13/05	07/14/05
TOTAL INORGANIC CARB	002	S	05LTZA53	06/27/05	07/21/05	07/21/05
B1D994						
% SOLIDS	003	S	05L%S090	06/29/05	07/08/05	07/08/05
CHROMIUM VI	003	s	05LVI044	06/29/05	07/11/05	07/11/05
NITRATE NITRITE	003	s	05LN3A36		07/11/05	07/12/05
TOTAL ORGANIC CARBON	003	S	05LTZ053		07/21/05	07/21/05
OIL & GREASE BY GRAV	003	S	05LOG033		07/13/05	07/14/05
TOTAL INORGANIC CARB	003	s	05LTZA53	06/29/05	07/21/05	07/21/05
B1D995						
% SOLIDS	004	s	05L%S090	06/30/05	07/08/05	07/08/05
CHROMIUM VI	004	S	05LVI044	·	07/11/05	07/11/05
CHROMIUM VI	004 REP	s	05LVI044		07/11/05	07/11/05
		-		• •		



# Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD F05-023 H3246

DATE RECEIVED: 07/07/05 LVL LOT # :0507L899

CLIENT ID /ANALYSIS	<u>rv</u> r	#	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
							<del></del>
CHROMIUM VI	004	MS	S	05LVI044	06/30/05	07/11/05	07/11/05
CHROMIUM VI	004	MSD	S	05LVI044	06/30/05	07/11/05	07/11/05
NITRATE NITRITE	004		S	05LN3A36	06/30/05	07/11/05	07/12/05
TOTAL ORGANIC CARBON	004		S	05LTZ053	06/30/05	07/21/05	07/21/05
OIL & GREASE BY GRAV	004		s	05LOG033	06/30/05	07/13/05	07/14/05
OIL AND GREASE BY GR	004	REP	s	05LOG033	06/30/05	07/13/05	07/14/05
OIL AND GREASE BY GR	004	MS	S	05L0G033	06/30/05	07/13/05	07/14/05
TOTAL INORGANIC CARB	004		S	05LTZA53	06/30/05	07/21/05	07/21/05

LAB QC:

CHROMIUM VI	MB1	S	05LVI044	N/A	07/11/05	07/11/05
CHROMIUM VI	MB1 BS	S	05LVI044	N/A	07/11/05	07/11/05
CHROMIUM VI	MB1 BSD	S	05LVI044	N/A	07/11/05	07/11/05
NITRATE NITRITE	MB1	S	05LN3A36	N/A	07/11/05	07/12/05
NITRATE NITRITE	MB1 BS	S	05LN3A36	N/A	07/11/05	07/12/05
TOTAL ORGANIC CARBON	MB1	W	05LTZ053	N/A	07/21/05	07/21/05
TOTAL ORGANIC CARBON	MB1 BS	W	05LTZ053	N/A	07/21/05	07/21/05
OIL & GREASE BY GRAV	MB1	S	05LOG033	N/A	07/13/05	07/14/05
OIL AND GREASE BY GR	MB1 BS	s	05LOG033	N/A	07/13/05	07/14/05
OIL AND GREASE BY GR	MB1 BSD	s	05LOG033	N/A	07/13/05	07/14/05
TOTAL INORGANIC CARB	MB1	W	05LTZA53	N/A	07/21/05	07/21/05
IOTUTI THOUGHTIE CHUE	4-340-4	**	4 4 - + 1 t - 2	/	,,	,



## **Analytical Report**

Client: TNU-HANFORD F05-023 H3246

LVL#: 0507L899

# INORGANIC NARRATIVE

This narrative covers the analyses of 4 soil samples. 1.

The samples were prepared and analyzed in accordance with the methods indicated on the attached 2. glossary.

LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.

- Sample holding times as required by the method and/or contract were met. 3.
- The results presented in this report are derived from samples that met LvLI's sample acceptance 4. policy.
- The method blanks were within the method criteria. 5.
- The Laboratory Control Samples (LCS) were within the laboratory control limits. 6.
- The matrix spike recoveries for Nitrate Nitrite, Total Organic Carbon (TOC), Chromium VI and Oil 7. and Grease were within the 75-125% control limits.
- The replicate analyses for Nitrate Nitrite, Chromium VI and Oil and Grease were within the 20% 8. Relative Percent Difference (RPD) control limit however replicate analyses for TOC and TIC were outside the control limit that may be attributed to sample inhomogeneity.
- Results for solid samples are reported on a dry weight basis and TOC and TIC samples are dried 9. prior to analysis.
- I certify that this sample data package is in compliance with SOW requirements, both technically 10. and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Laboratory Manager

Lionville Laboratory Incorporated

njp\i07-899

W.O.#: 11343-606-001-9999-00

Date Received: 07-07-05

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 15 pages.

# Lionville Laboratory Incorporated WET CHEMISTRY

# METHODS GLOSSARY FOR SOIL/SOLIDS SAMPLE ANALYSIS

	<u>ASTM</u>	SW846	<u>OTHER</u>
% Ash	D2216-80		
	D2216-80		ILMO4.0 (e)
% Moisture	D2216-80		ILMO4.0 (e)
% Solids	D2216-80		
% Volatile Solids	D3987-81/85		
ASTM Extraction in Water	<del></del>		
BTU	D240-87	9081	a.
CEC		J 3060A/7196A	_ <sup>c</sup>
Chromium VI		<del></del>	
Corrosivity by coupon by pH		1110(mod) 9045C	TI MOA O (a)
Cyanide, Total		9010B	ILMO4.0 (e)
Cyanide, Reactive		Section 7.3/9014	TD A COO!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Halides, Extractable Organic		— 9020B	EPA 600/4/84-008
Halides, Total		9020B	EPA 600/4/84-008
EP Toxicity		1310A	
Flash Point		$-\frac{1010}{1010}$	
Ignitability		1010	I roa 413 1 (mod.)
Oil & Grease	•	√ 9071A (mod.)	∠ EPA 413.1 (mod) / 415.1
Carbon, Total Organic and Inov	<b>v</b>	9060	Lloyd Kahn (mod) (415.)
Oxygen Bomb Prep for Anions	D240-87(mod)	<del></del>	,
Petroleum Hydrocarbons, Total Rec	overable	9071	EPA 418.1
pH, Soil		9045C	
Sulfide, Reactive		Section 7.3/9030B	
Sulfide		9030B(mod)	
Specific Gravity	D1429-76C/ _	D5057-90	
Sulfur, Total		9056	
Synthetic Preparation Leach		1312	
Paint Filter		9095A	
Other: Atrate Vitrite	Method:	0A 353.2 (mad.)	
Other:	Method		

# Lionville Laboratory Incorporated

# METHOD REFERENCES AND DATA QUALIFIERS

# **DATA QUALIFIERS**

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- \* = Indicates that the original sample result is greater than 4x the spike amount added.

# **ABBREVIATIONS**

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LC = Laboratory Control Sample.

NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

# ANALYTICAL WET CHEMISTRY METHODS

- ASTM Standard Methods.
- USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).
- 3. Test Methods for Evaluating Solid Waste (USEPA SW-846).
- a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).
- b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).
- c. <u>Method of Soil Analysis</u>, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).
- d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).
- e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.
- f. Code of Federal Regulations.

## INORGANICS DATA SUMMARY REPORT 07/22/05

CLIENT: TMUHANFORD F05-023 H3246 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0507L899

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
				***	FF 등 등 등 등 등 다 드는	
-001	B1D992	t Solids	98.1	ŧ	0.01	1.0
		Chromium VI	0.20 u	MG/KG	0.20	1.0
		Nitrate Nitrite	0.20 ს	MG/KG	0.20	1.0
		Total Organic Carbon	43.7	MG/KG	32.4	1.0
		Oil & Grease Gravimetri	680 u	MG/KG	680	1.0
		Total Inorganic Carbon	2910	MG/KG	55.3	1.0
-002	B1D993	% Solids	98.0	*	0.01	1.0
		Chromium VI	0.20 u	MG/KG	0.20	1.0
		Nitrate Nitrite	0.36	MG/KG	0.20	1.0
		Total Organic Carbon	71.2 u		71.2	1.0
		Oil & Grease Gravimetri	680 n	MG/KG	680	1.0
		Total Inorganic Carbon	1370	MG/KG	235	1.0
-003	B1D994	% Solids	97.5	*	0.01	1.0
		Chromium VI	0.20 u	MG/KG	0.20	1.0
		Nitrate Nitrite	0.22	MG/KG	0.20	1.0
		Total Organic Carbon	743	MG/KG	33.3	1.0
		Oil & Grease Gravimetri	684 u	MG/KG	684	1.0
		Total Inorganic Carbon	45.6 u	MG/KG	45.6	1.0
-004	B1D995	% Solids	92.6	ŧ	0.01	1.0
		Chromium VI	0.22 u	MG/KG	0.22	1.0
		Nitrate Nitrite	0.21 ប	MG/KG	0.21	1.0
		Total Organic Carbon	224	MG/KG	121	1.0
		Gil & Grease Gravimetri	720 u	MG/KG	720	1.0
		Total Inorganic Carbon	104 u	MG/KG	104	1.0

## INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/22/05

CLIENT: TNUHANFORD F05-023 H3246 LVL LOT #: 0507L899

WORK ORDER: 11343-506-001-9999-00

WORK ORDER	(: TT343-200-00T-3333-(	JU				
					REPORTING	DILOTION
SAMPLE	SITE ID	ANALYTE	result	UNITS	LIMIT	FACTOR
	3486549K====777KE=980		******			
BLANK10	05LV1044-MB1	Chromium VI	0.20 u	MG/KG	0.20	1.0
BLANK10	05LN3A36-MB1	Nitrate Nitrite	0.20 Ⴁ	MG/KG	0.20	1.0
BLANK10	05LTZ053-MB1	Total Organic Carbon	4.7 u	MG/KG	4.7	1.0
BLANKIO	05LOG033-MB1	Oil & Grease Gravimetri	667 u	MG/KG	667	1.0
BLANK10	05LTZA53-MB1	Total Inorganic Carbon	4.7 u	MG/KG	4.7	1.0

## INORGANICS ACCURACY REPORT 07/22/05

CLIENT: TNUHANFORD F05-023 H3246

LVL LOT #: 0507L899

WORK	ORDER .	11343-606-001-9999-00
HOME		77343-000-007 3333 00

			SPIKED	INITIAL	SPIRED		DILUTION
Sample	SITE ID	ANALYTE	SAMPLE	RESULT	AMOUNT	*RECOV	FACTOR (SPK)
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-001	B1D992	Nitrate Nitrite	5.5	0.201	5.1	108.8	1.0
		Total Organic Carbon	8230	43.7	0008	102,3	1.0
-004	B1D995	Soluble Chromium VI	4.3	0.20u	4.3	99.3	1.0
		Insoluble Chromium VI	1350	0.20u	1240	108.3	100
		Oil & Grease Gravimetr	5760	720 u	7750	74.3	1.0
BLANK10	05LVI044-MB1	Soluble Chromium VI	4.0	0.20u	4.0	101.0	1.0
		Insoluble Chromium VI	1360	0.20u	1180	115.5	100
BLANKIO	05LN3A36-MB1	Nitrate Nitrite	5.4	0.20u	5.0	108.4	1.0
BLANK10	05LTZ053-MB1	Total Organic Carbon	390	4.7 u	400	97.6	1.0
BLANK10	05LOG033-MB1	Oil & Grease Gravimetr	7890	667 u	7170	110.0	1.0

## INORGANICS PRECISION REPORT 07/22/05

CLIENT: TNUHANFORD P05-023 H3246

LVL LCT #: 0507L899

WORK ORDER: 11343-606-001-9999-00

			INITIAL			DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	REPLICATE	RPD	FACTOR (REP)
				=======	***	
-001REP	B1D992	Nitrate Nitrite	0.20u	0.20u	NC	1.0
		Total Organic Carbon	43.7	51.4 u	200	1.0
		Total Inorganic Carbon	2910	1510	63.5	1.0
-004REP	B1D995	Chromium VI	0.22u	0.22u	NC	1.0
		Oil & Greege Gravimetri	720 u	720 u	NC	1.0

Lionville	Laboratory	Use Only

# Custody Transfer Record/Lab Work Request Page\_/of/\_



05070	18	99		FIELD PER	RSON	NEL:	COMP	LETE O	NLY SH	ADE	D AR	EAS			A-	<del>-</del>			\$60	<b>9</b> S	RC			<u></u>
77	77	HANFOU	7 % Z	C.C.	, <b>1</b>		Hefriger	rator #							1									
Est. Final Proj.	Sampl	ling Date			<b></b> .		#/Type	Container	Liquid Solid						G								-	.
Brolest Contra	4/06-5	3-606-0	· , -	and the second			Volume		Liquid Solid						<i>120</i> -			- :			/	-		
Lionville Labor	ratory f	roject Manage	<u> </u>	7 (4 Q)	<del></del> .	ers Para paga san	Preserv	etives	79.77	<b> </b>	-				,,,,,,,	*****								
ac soles	De	Stel	TAT B	Days	-	<del>-</del>	<u> </u>		<del></del>		ORG	ANIC		17%	OIL	1/4/	INC	RG	1°C	70¢	MR		, _	<del></del>
Lionville Labor	7/1	105 D	nte Due	8/4/05			REQUE		<del></del>	ğ	8N ₹	Pest/ PCB	Herb	- 4	E.	yay Cyre <sub>n</sub>		*			NOS	j.	Service Service	
MATRIX													ı		Llon	ville La	bornto	ry Use	Only		Ī			_
GODES:  B. Soll BE Sediment BO Bold SL Bluggs W & Water	Leb ID	Ci	ent ID/Descri	ption	Ch	eirix OC osen (/)	Metrix	Date Collected	Time Collected						7006R	#CR6			FFEC	10CT	THENT			:
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DL - Drum Liquids	003	Life Harris	$\frac{3}{4}$			-		6-2905	0105	<del> </del>				ļ ——,	1				./					
L - EP/TCLP	004	1	5			<del> </del>		6-30-05	0705	3177		-		<del>                                     </del>	- t	7					J			
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1	Fluo	r Hanford Inc.		CHAIN (	OF CUSTOD	Y/SAMPLE A	NALYSIS I	REQUEST		F05	-023-035		PAGE 1	OF 1
COLLECTOR Pope/Pfister	l /Mokler/Weis/	Туга	COMPANY CONTRENT, SJ	FACT		L <b>EPHONE NO</b> 373-5869		PROJECT TRENT,	COORDINATO	PRI	ICE CODE	8N		ATA LAROUND
SAMPLING	LOCATION	<del></del>	PROJECT DESIG	NATION				SAF NO.		AIR	QUALITY			Days /
216-A-8, I			216-A-8 Crib Cha		hole			F05-023 45 Days						Days
ICE CHEST	على المراجع	600	FIELD LOGBOO	K NO.		COA		ľ	OF SHIPMENT					
		-500	HNF-N-336-1			119152ES1	, 		. EXPRESS					
SHIPPED TO Lionville Lab	o oratory incorp	orated	OFFSITE PROPE	RTY NO TIC	158	76 d		BILL OF	LADING/AIR B	Otl	150	762		
MATRIX*	POSSIBL	E SAMPLE HAZARDS/ REMARKS	PRESER	VATION	Cool 4C					<i>4j.</i> 15				
DL=Drum Liquids OS=Orum	Lad -	tu to B10987	TYPE OF C	ONTAINER	G		-	<del>                                     </del>						
Solids L=Liquid O=OH S=Soli	1/44	10 10 12 115 1 V	NO. OF COM	ITAINER(S)	1									
SE=Sediment T=71ssue V=Vegitation W=Water			Aor	UME	120mL	·								
WI=Wipe	SPECIAL	LHANDLING AND/OR STORAGE	SAMPLE A	NALYSIS	SEE ITEM (1) II SPECIAL INSTRUCTIONS					··· •				
SAM	PLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME										
B1D992		SOIL	L.,,				1			. ,	<u></u>			
			6/23/05	7240	_ <b>_</b>		<del> </del>					<u> </u>		
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FINAL SAI DISPOSI	Mupelic	POSAL METHOD						DISPOSED BY					DATE/TIME	

	Fluor H	anford Inc.		CHAIN (	OF CUSTOD	Y/SAMPLE AI	IALYSIS R	LEQU <b>ES</b> T			F05-023-0	36	PAGE 1 0	F 1
COLLECTOR Pope/Pfister/Mokia	er/Wels/Tv	·a	COMPANY CONT	ACT		LEPHONE NO. 173-5869		PROJECT	COORDINAT	OR	PRICE CO	DE 8N	DAT TURNAR	
SAMPLING LOCA	<u>-</u>		PROJECT DESIG	NATION				SAF NO.			AIR QUAL	את 🗌	45 Days / 45 Days	
216-A-8, I-6	.,,-0.1		216-A-8 Crib Cha		hole			F05-023			<u></u>		45 0	ays 
TOC CHEET NO	<b>7</b> Co	~~	FIELD LOGBOOM	NO.		COA	METHOD OF SHIPMENY							
21	HUS	-500	HNF-N-336-1			119152ES10		FEDERAL						
SHIPPED TO  Lionyille Laborator			OFFSITE PROPE	u PT	158	62		BILL OF L	ADIMOYATR 20	777	150	12		
A-Air	OSSIBLE !	SAMPLE HAZARDS/ REMARKS	PRESER	VATION	Cool 4C									
DL∞Drum tiquids OS∞Drum Solids	2,1	tuBID188	TYPE OF CO	ONTAINER	G									
L=Liquid O=Oil S=Soil	au X	(101711/100	NO. DF CON	TAINER(S)	1									
SE=Sectiment T=Tissue V=Vegitation W=Water			VOL	IME	120mL									
WI-Wos -	SPECIAL H	ANDLING AND/OR STORAGE	SAMPLE A	NALYSIS	SEE ITEM (1) 11 SPECIAL INSTRUCTIONS	R								
SAMPLE N	iO.	MATRIX*	SAMPLE DATE	SAMPLE TIME							:			
B1D993		SOIL	4275	1.205	X									
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RELINQUISHED BY		YED BY	NECESTED BY		<del></del>		<u> </u>	TITLE		<del></del> =	<del></del>		DATE/TIME	
LABORATORY SECTION					- <del></del>			DISPOSED BY	<del></del>				DATE/TIME	
FINAL SAMPLE DISPOSITION	: 1	ISAL METHOD												

	F	luor Hanford Inc.		CHAIN	OF CUSTOE	Y/SAMPLE	ANALYSIS	REQUEST		F05-023-037	PAGE 1 OF 1				
COLLECTOR Pope/Pfister/		els/Tyra	COMPANY (	CONTACT		<b>LEPHONE N</b> 373-5869	D.	PROJECT (							
SAMPLING I	OCATIO	N	PROJECT D	ESIGNATION				SAF NO.	45 Days /						
216-A-8, I-	-7		216-A-8 Crit	Characterization Bor	ehole			F05-023							
ICE CHEST			FIELD LOGI	OOK NO.		COA		METHOD OF SHIPMENT							
	2HW	2-500	HNF-N-33	5-1		119152E51	l <b>0</b> 	FEDERAL E	ERAL EXPRESS						
SHIPPED TO	)		OFFSITE PR	Ser DTR	1580	12		BILL OF L	LEU PT	15862					
MATRIX* A⇒Air DL=Drum	POSS	IBLE SAMPLE HAZARDS/ REMAR	cs PRE	SERVATION	Coal 4C										
Liquids DS=Orum Solids		711000	TYPE	F CONTAINER	G										
L≃Liquid O≈Oll S≈Sail	1500	itutoBID989	NO. OF	CONTAINER(S)	1										
SE=Sediment T=Tissue V=VegRation W=Water	•			VOLUME	120mL										
WI=Wipe X=Other	SPEC	IAL HANDLING AND/OR STORA	E SAME	LE AMALYSIS	SPE ITEM (1) I SPECIAL INSTRUCTION	DN 5									
SAMF	PLE NO.	MATRIX*	SAMPLE DA	TE SAMPLE TIME	ž į			:							
B1D994		SOIL	4/29/	20902	X.										
<u> </u>					<del> </del>		- <del> </del>								
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CHAIN OF P	OCCECCY.	ANI	ETCH! D	RINT NAMES			<u> </u>	SPECIAL INSTR	SICTIONS						
CHAIN OF P	O22E221	UN	314N/ FI	CINI NAMES						ium Hex - 7196; TIC - 415	i.1M: TOC - 415.1:				
RELINQUISHE  MR.WE  RELINQUISH	OVED FROM  1/29/5 5 //  OVED F	RECEIVED  RECEIVED  RECEIVED  RECEIVED	BY/STORED IN	Bull	4/05 / Hubbs		NO2/NO3 - 353								
RELINGUISH	ED BY/REA	40VED FROM DATE/TI	TE RECEIVED	WY/STORED IN	7-	DATE,	TIME C/O								
RELINQUISH	ED BY/REA	10VED FROM DATE/TI		BY/STOREN IN	<i>I</i>		/TIME								
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FINAL SAM DISPOSIT	TPLE	DISPOSAL METHOD				·		DISPOSED BY			DATE/TIME				

	Fluc	or Hanford Inc.	T	CHAIN	OF CUSTOD	Y/SAMPLE /	NALYSIS I	REQUEST		F05-023-038		PAGE 1 OF 1	
COLLECTOR Pope/Pfister/		/Tyra	COMPANY CON	NTACT		LEPHONE NO 373-5869	),	PROJECT ( TRENT, 5)	COORDINATOR	PRICE CODE	8N	DATA TURNAROUND	
SAMPLING L			PROJECT DESI					SAF NO. F05-023		AIR QUALITY		45 Days /	
216-A-8, I-			FIELD LOGBOO	naracterization Bore	hole	COA		METHOD OF SHIPMENT					
	2HW	650D	HNF-N-336-1			119152ES1	0	FEDERAL I	EXPRESS				
SHIPPED TO Lionville Labo		porated	OFFSITE PROP	erty no	1586	2		BILL OF L	PU J	1576	2		
MATRIX* A⇒Alr DL⇔Drum	POSS1B	LE SAMPLE HAZARDS/ REMAR	(S PRESE	RVATION	Cool 4C								
.iquids DS=Drum Solids	2	tute BID990	TYPE OF	TYPE OF CONTAINER									
L=Uquid 0=0   6=Sall 6E=Sadiment F=Tissue V=Vegitation	tau	TO DID IT		NTAINER(S)	1 120mL								
W=Water WI=Wipe K≃Other	SPECIA	IL HANDLING AND/OR STORAG	E SAMPLE	ANALYSIS	SPE ITEM (1) R SPECIAL DISTRUCTIONS	N					<del></del>		
SAMP	PLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME							_		
1D995		SOIL	430/5	2040	X					· ·			
			1-1-										
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				<u> </u>	<u> </u>								
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rem Noorene	D BY/REMOV	PA TANIAN 7/01 05 (		STORED IN	<del></del>	DATE/	TIME						
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RELINQUISHE	D BY/REMO	VED FROM DATE/TIM	RECEIVED BY	STORED IN		DATE/	TIME						
(ELINQUISHE	D BY/REMOV	/ED FROM DATE/TIM	RECEIVED BY	STORED IN		DATE/	TIME						
LABORATO SECTION	DRY RE	CEIVED BY					———- <sup>J</sup> — Т	TILE				DATE/TIME	
FINAL SAM DISPOSITI	IPLE	SPOSAL METHOD	~···				O	ISPOSED BY	_,			DATE/TIME	

# Lionville Laboratory Incorporated SAMPLE RECEIPT CHECKLIST (SRC)

CLIEN	NT: TNU-4 ANFORD	Da	ite: 7/7/0.	· 5
Purchase SAF#)S	e Order / Project# / SOW# / Release #: F05 - 023		• .	
	Batch #: 05076899	Sa	mple Custo	dian: Victor Neeman
	NOTE: EXP	LAIN ALL DI	SCREPANCII	es O
1.	Samples Hand Delivered or Shipped	Carrier -	W &	Airbill# 7905 6788 1198
2.	Custody seals on coolers or shipping container intact, signed and dated?	□ Yes	□ No	□ No Seals Comments
3.	Outside of coolers or shipping containers are free from damage?	₹ Yes	□ No	
4.	All expected paperwork received (coc and other client specific information) sealed in plastic bag and easily accessible?	Pres	□ No	
5,	Samples received cooled or ambient?	Temp $\mathcal{J}$	3 °C	Cooler # SAWS - 500
6.	Custody seals on sample containers intact, signed and dated?	D/cs	□N₀	□ No Seals
7.	coc signed and dated?	D-Yes_	□ No	
8.	Sample containers are intact?	₽ Yes	.□ No	
9.	All samples on coc received? All samples received on coc?	D)/es	□ No	
10.	All sample label information matches coc?	D/Yes	□ No	
11.	Samples properly preserved?	Dies	□ No	
	Samples received within hold times? Short holds taken to wet lab?	CIX'6	□ No	
13.	. VOA, TOC, TOX free of headspace?	□ Yes	□ No	6 N/A
14.	. QC stickers placed on bottles designated by client?	□ Yes	□ No	ONIA
15.	. Shipment meets LvLI Sample Acceptance Policy? (Identify all bottles not within policy. See reverse side for policy)	D/ es	□ No	
16.	Project Manager contacted concerning discrepancies? name/date (or samples outside criteria)	□ Yes	□ No	El No Discrepancies





Geotechnical Laboratory PO Box 4339 1570 Bear Creek Road Oak Ridge TN 37830 (865) 482-6497

## CERTIFICATE OF ANALYSIS

Stephen Trent Fluor Hanford, Inc. 825 Jadwin Avenue Richland, Washington 99352

This is the Certificate of Analysis for the following samples:

Shaw Project ID: Shaw Project Number: Client Sample Data Group: Date Received by Lab: Number of Samples: Sample Type: Eberline - Hanford 100846.63000000 H3246 July 11, 2005 Four (4) Soil



August 24, 2005

Introduction/Case Narrative

Four soil samples were received by the Shaw Geotechnical Laboratory on July 11, 2005. Samples were submitted for determination of moisture content, bulk density, sieve analysis, specific gravity, and calcium carbonate content. In addition, two of the samples required testing for bulk specific gravity due to the coarse nature of the samples. Sample numbers received were B1D992, B1D993, B1D994, and B1D995.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

Ralph Cole

Laboratory Manager, Geotechnical Services

00000001

Page 2 of 18
August 24, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.63000000
SDG No. H3246

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

# II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, Laboratory Soils Testing, appendix II, 1970; United States Environmental Protection Agency, SW846, Test Methods for Examining Solid Waste, Physical/Chemical Methods, 3rd ed., Nov 1986 (EPA SW-846), Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, Soil and Rock (I), and Volume 04.09, Soil and Rock (II), 2005. Shaw Environmental and infrastructure, Standard Operating Procedures.

Moisture Content of Soil and Rock	ASTM D 2216
Bulk Density of Soils	EM 1110-2-1906
Particle-size Analysis of Soils	ASTM D 422
Specific Gravity of Soil	ASTM D 854
Specific Gravity of Coarse Aggregate	ASTM C 127
Calcium Carbonate Content	ASTM D 4373
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# III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.
- Routine instrument calibration instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

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August 24, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.63000000
SDG No. H3246

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

- Maintenance of all past calibration records calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.
- Certified and trained personnel all technicians are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.
- Quantitative analyses frequently used in geotechnical/physical testing programs do not use
  QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed
  in the analysis of samples reported in this report include: laboratory control samples (LCS),
  blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors,
  surrogate sample analyses, detection limit determinations, control charts, and/or tentatively
  identified compounds (TICs).

IV.Data Qualification

None.

Appendix A
Sample Cross-Reference List

Page 4 of 18 August 24, 2005 Stephen Trent Fluor Hanford, Inc. Shaw Project Name: Eberline Hanford

Shaw Project No. 100846.63000000

SDG No. H3246

**Shaw Geotechnical** Laboratory Oak Ridge TN (865) 482-6497

# SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX	
BC0594	B1D992 B1D993 B1D994 B1D995	Soil Soil	

Appendix B Sample Test Results Page 5 of 18
August 24, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.63000000
SDG No. H3246

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

# **MOISTURE CONTENT**

PROJECT NAME

**Eberline Hanford** 

PROJECT NUMBER

100846.63000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MOISTURE, % ASTM D 2216	MOISTURE, % SW846	SOLIDS, % SW846
BC0593	B1D992	2.4	2.3	97.7
BC0594	B1D993	2.6	2.5	97.5
BC0595	B1D994	3.3	3.2	96.8
BC0596	B1D995	9.4	8.6	91.4
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ASTM D 2216 results are based on dry sample weight. SW846 results are based on wet sample weight. Solids content is determined by subtracting the SW846 moisture (%) from 100. Page 6 of 18 August 24, 2005 Stephen Trent Fluor Hanford, Inc.

Shaw Project Name: Eberline Hanford Shaw Project No. 100846.63000000

SDG No. H3246

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

### BULK DENSITY/DRY DENSITY ASTM C 2937

PROJECT NAME:

**Eberline Hanford** 

PROJECT NUMBER:

100846.63000000

LAB	CLIENT	AVERAGE	AVERAGE	WET	MOISTURE	BULK	DRY
SAMPLE	SAMPLE	LENGTH.	DIAMETER.	WEIGHT,	CONTENT.	DENSITY,	DENSITY,
NUMBER	NUMBER	inches	inches'	grams	%	pcf	pcf
BC0593	B1D992	5.9975	3.8667	2018.61	2.2	109.2	106.9
BC0594	B1D993	5.6497	3.8992	2398.50	2.2	135.5	132.6
BC0595	B1D994	5.9915	3.8768	2254.69	3.3	121.5	117.6
BC0596	B1D995	5.9795	3.8835	2863.11	7.06	154.0	143.9
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Moisture content calculated by ASTM D 2216 based on sample dry weight.

Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).

Dry density is the weight of the dry sample solids divided by the volume of the original sample.

Page 7 of 18 August 24, 2005 Stephen Trent Fluor Hanford, Inc. Shaw Project Name: Eberline Hanford Shaw Project No. 100846.63000000 SDG No. H3246

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

### PARTICLE-SIZE DISTRIBUTION ASTM D 422

Project Name Eberline Hanford

Field Sample No. B1D992

Project No.

100846.63000000

Lab Sample No.

BC0593

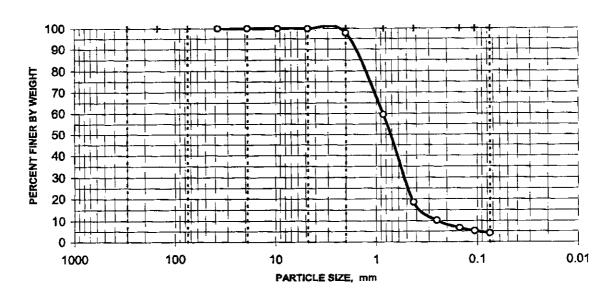
Moisture Content = 2.2% based on dry sample weight

#### SIEVE ANALYSIS

	Sieve	Diameter	Percent
	No.	mm	Finer
CO	3"	75.000	100.0%
Ă	1.5"	37.500	100.0%
R	0.75	19.000	100.0%
S E	0.375"	9.500	100.0%
E .	#4	4.750	99.8%
	#10	2.000	97.8%

	Sieve	Diameter	Percent	
	No.	mm	Finer_	
F	#20	0.850	59.4%	
1	#40	0.425	18.5%	
N	#60	0.250	10.2%	
Е	#100	0.149	6.6%	
	#140	0.106	5.2%	
	#200	0.075	4.1%	

#### **DISTRIBUTION CURVE**



0.2% Gravel

95.7% Sand

4.1% Silt/Clay

Page 8 of 18 August 24, 2005 Stephen Trent Fluor Hanford, Inc.

Shaw Project Name: Eberline Hanford Shaw Project No. 100846.63000000

SDG No. H3246

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

# PARTICLE-SIZE DISTRIBUTION ASTM D 422

Project Name Eberline Hanford

Field Sample No. B1D993

Project No.

100847

Lab Sample No.

BC0594

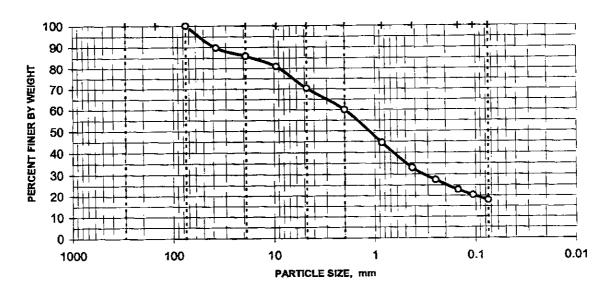
Moisture Content = 2.2% based on dry sample weight

#### SIEVE ANALYSIS

	Sieve	Diameter	Percent
	No.	mm	Finer
CO	3"	75.000	100.0%
Ā	1.5"	37.500	89.8%
R	0.75"	19.000	85.9%
S	0.375"	9.500	80.8%
_	#4	4.750	70.3%
	#10	2.000	59.9%

	Sieve	Diameter	Percent
	No.	mm	Finer
F	#20	0.850	44.5%
i	#40	0.425	33.0%
N	#60	0.250	27.5%
E	#100	0.149	22.9%
	#140	0.106	20.3%
<u> </u>	#200	0.075	17.9%

#### **DISTRIBUTION CURVE**



29.7% Gravel

52.4% Sand

17.9% Silt/Clay

00000010

Page 9 of 18 August 24, 2005 Stephen Trent Fluor Hanford, Inc. Shaw Project Name: Eberline Hanford Shaw Project No. 100846.63000000 SDG No. H3246

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

## PARTICLE-SIZE DISTRIBUTION ASTM D 422

Project Name Eberline Hanford

Field Sample No. B1D994

Project No.

100846.63000000

Lab Sample No.

BC0595

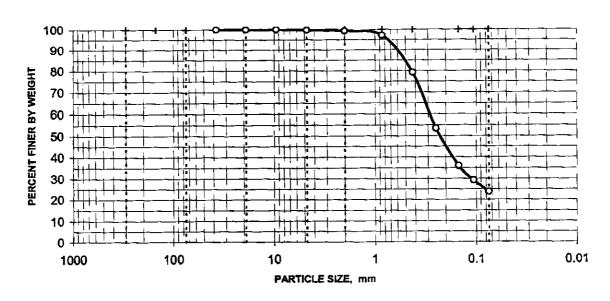
Moisture Content = 3.3% based on dry sample weight

#### SIEVE ANALYSIS

	Sieve	Diameter	Percent
	No.	mm	Finer
CO	3"	75.000	100.0%
Ă	1.5"	37.500	100.0%
R	0.75"	19.000	100.0%
S	0.375"	9.500	100.0%
	#4	4.750	99.8%
	#10	2.000	99.3%

	Sieve	Diameter	Percent
	No.	mm	Finer
F	#20	0.850	97.1%
i	#40	0.425	79.2%
N	#60	0.250	53.5%
E	#100	0.149	36.1%
	#140	0.106	29.2%
	#200	0.075	23.7%

#### **DISTRIBUTION CURVE**



0.2% Gravel

76.1% Sand

23.7% Silt/Clay

00000011

Page 10 of 18 August 24, 2005 Stephen Trent Fluor Hanford, Inc.

Shaw Project Name: Eberline Hanford Shaw Project No. 100846.63000000

SDG No. H3246

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

# PARTICLE-SIZE DISTRIBUTION ASTM D 422

Project Name Eberline Hanford

Field Sample No. B1D995

Project No.

100847

Lab Sample No.

BC0596

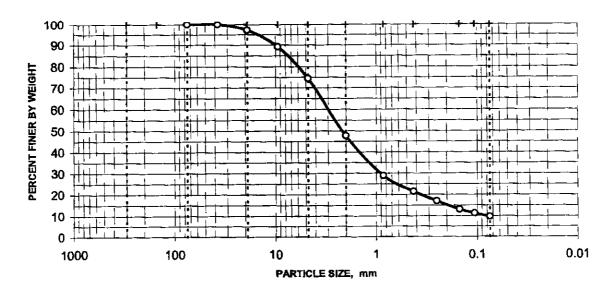
Moisture Content = 7.1% based on dry sample weight

#### SIEVE ANALYSIS

	Sieve	Diameter	Percent
	No.	mm	Finer
CO	3"	75.000	100.0%
Ă	1.5"	37,500	100.0%
R	0.75"	19.000	97.2%
S	0.375"	9.500	89.2%
-	#4	4.750	74.6%
	#10	2.000	47.7%

	Sieve	Diameter	Percent
	No.	mm	Finer
F	#20	0.850	28.9%
i	#40	0.425	21.4%
N	#60	0.250	17.0%
E	#100	0.149	13.1%
	#140	0.106	11.2%
	#200	0.075	9.7%

#### **DISTRIBUTION CURVE**



25.4% Gravel.

64.9% Sand

9.7% Silt/Clay

00000012

Page 11 of 18 August 24, 2005 Stephen Trent Fluor Hanford, Inc. Shaw Project Name: Eberline Hanford Shaw Project No. 100846.63000000 SDG No. H3246

**Shaw Geotechnical** Laboratory Oak Ridge TN (865) 482-6497

### **SPECIFIC GRAVITY ASTM C 127**

PROJECT NAME:

**Eberline Hanford** 

PROJECT NUMBER: 100846.63000000

						4455465	BULK SPECIFIC	
			BUCK	AVERAGE	APPARENT			
SHAW	CLIENT	SPECIFIC		BULK SPECIFIC		1	GRAVITY SAT.	
NUMBER	NUMBER	GRAVITY"	GRAVITY	GRAVITY	GRAVITY	SPEC. GRAV	SURFACE DRY	%
BC0593	B1D992	2.7280	NA	2.7280			<u> </u>	<u> </u>
BC0594	B1D993	2.7726	2.8246	2.7878	2.8926	2.8072	2.8481	0.83
BC0595	B1D994	2.7168	NA	2.7168				
BC0596	B1D995	2.8229	2.6732	2.7833	2.7344	2.7999	2.6956	0.84
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NA = Sample did not contain appreciable coarse particles applicable to this test.

<sup>\*</sup> Material < 4.75 mm (#4) sleve

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August 24, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.63000000
SDG No. H3246

Shaw Geotechnical Laboratory Oak Ridge TN (865) 482-6497

# Carbonate Content of Soils ASTM D 4373

PROJECT NAME:

**Eberline Hanford** 

PROJECT NUMBER:

100846,63000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	CO3, %
BC0593	B1D992	2
BC0594	B1D993	1
BC0595	B1D994	1
BC0596	B1D995	0
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Appendix C Chain-of-Custody and Request-for-Analysis Records 9690 DB

**BC** 0262

**BC** 0284

**BC** 0263

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*****	E34SB	E3328	ัธธรรฐ	E3318	E3298	DISPOS	WAHS	7-S BID992	
******	E3458	E3328	SECEE	EISIS	E3538	DIRBOR	WAHS	/- C BID663	<b>7</b> 20
*******	E3452	E332g	SEEEA	EBBIR	SEZEX	DISDOR	WAHS	7-S BID334	₹E0
	E342S	E3322	E3333	E33TR	Sezen	DISPOS	WAHS	/-2 BID382	₹ <b>₽</b> 0

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ECAD: 01/01/02 DOE: 08/57/02

MOBER ID: 274 k02-053 2DC H3540

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Eberline Srvces

PAGE 1

OBO # 12-07-032

CHALIN OF COSTODY

Syce H BROWS

Fluor Henford Inc.			CHAIN OF CUSTODY/SAMPLE ANALYSIS REQ						QUEST		F05-023-040		OF 1
COLLECTOR			COMPANY CONTACT TELEPHONE NO.					PROJECT	PROJECT COORDINATOR PRICE CODE 8N DATA				
Pope/Pfister/Mokler/Weis/Tyra			TRENT, 5J 373-5869					TRENT, S.	TRENT, SJ JURNAR				NAROUND
SAMPLING LOCA	TION		PROJECT DESIGNATION					SAF NO. F05-023	AF Design				
216-A-8, I-5			216-A-8 Crib Characterization Borehole						AF CUIDLENT	<u> </u>			
ICE CHEST NO	-03-	- 631X	FIELD LOGBOOI HNF-N-336-1	K NO.		11915ZES10		FEDERAL	OF SHIPMENT EXPRESS				
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Shaw Group					151	'YY		Su PTC 15844					
441777777	SCIPLE (	SAMPLE HAZARDS/ REMARKS	PRESERVATION		None	None		<del></del>	1200	11-12	<del></del>		
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L=Uquid 7 0=Oil 5=Soil 5E=Sediment	YU J	101/1/101			1	1							
T=Tissue V=Vegitation W=Water					1500g 2680g	200g							
WI=Wipe X=Other S	/I=Wipe		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Content - 02216;							
SAMPLE N	D	MATRIX*	SAMPLE DATE	SAMPLE TIME									
B1D992		SOIL	6/23/05	1340	X.	X					1		
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RELINDUISHED BY/REMOVED FROM 1/08/05 DATE/TIME			RECEIVED BY/S	STORED IN	DATE/TIME		ME						
RELINQUISHED BY/REMOVED FROM DATE/TIME			RECEIVED BY/STORED IN		DATE/TIME		ME						
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216-A-8, 1-6			216-A-8 Crib Characterization Borehole								<del></del>	<del></del>		
ICE CHEST NO 20			FIELD LOGBOOK NO. COA						of Shipment					
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Shaw Group	)	<u></u>	_ 2	ull	(1)	'047			20 KI	16 1704	<del>7</del>			
MATRIX* A≃Air DL=Drum	1 ~	LE SAMPLE HAZARDS/ REMARKS	TWE OF CONTAINED		None	None								
Liquids 05=Drum Solids	Kod	futo BIDITY			Split Spoon Liner	Moisture Resistant Cont	-							
L=Uquid O=Oil S=Soil	ישטיף	TO TO TAIL TO O			1	1	-							
SE∞Sediment T∞Tissue V=Vegitation W≃Water	SE∞Sediment T≈Tissue V=Vegitation		VOLUME		1500g	200g								
WI=Wipe X=Other	SPECIA	L HANDLING AND/OR STORAGE	SAMPLE A	MALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Content - D2216;								
SAM	PLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			٠.		-					
B1D993		SOIL	1/27/5	1205		×	•							
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	ED BY/REMOV		RECEIVED BY/S			6/27/5	ME (1	)Calcium Cari	bonate Content; B ry Sieve) - D422;	ulk <b>De</b> nsity - D293	37; Partici	ie Density - D8	354;	
RELINQUISH	ED BYANGE	3 7 6 05 ONE TIME	MARIN		authur	7/1/85 3	20							
RELINQUISH	ED BY/REMOV	AD FROM DATE STIME	RECEIVED BY STORED IN DATE/TIME					SDG# H3246						
RELINGUISHED BY/REMOVED FROM DATE/TIME			RECEIVED BY/S	<u> </u>	67	07 05 9; 76 DATE/TIME			3 <i>DG</i> 2	12~ 14				
FILEX KILLES SYNTHE DATE TYME			RECEIVED BY/STORED IN			DATE/TI	ME							
RELINQUISH	ED BY/REMOV	TED FROM DATE/TIME	RECEIVED BY/S	STORED IN		DATE/TI	AIR							
LABORAT SECTIO	UK!	CEIVED BY	11 0	C-0 /-	ele me -	u SUA-		TLE				DATE/TIME	2. Zo	
FINAL SAM	MPLE	ON HUSKEY DM POSAL METHOD	Huly	3 K -B/	υυ-, <u>; ε.</u> ς	or serve	DI:	SPOSED BY	<u>.                                    </u>			DATE/TIME	,,,,,	
L	l													

	Fluor	Hanford Inc.		REQUEST	QUEST			F05-023-042		1 0	F i				
COLLECTOR Pope/Pfister/	/Mokler/Wels/1		COMPANY CONTACT TELEPHONE NO. TRENT, 53 373-5869					PROJECT TRENT, S	COORDINATO	TOR PRICE CODE 8N DATA TURNAROUND					
SAMPLING	LOCATION		PROJECT DESI	SAF NO.	SAF NO. AIR QUALITY 45 Days /										
216-A-8, I	-7		216-A-8 C/b Ch	F05-023						~45 Da	<del>**</del> 4:				
ICE CHEST		B-018	FIELD LOGBOO HNF-N-336-1	COA 119152ES10	)	METHOD FEDERAL	OF SHIPMENT EXPRESS	•					٦		
SHIPPED TO			OFFSITE PROP	1580	dU		BILL OF LADING/AIR BATH NO								
MATRIX* POSSIBLE SAMPLE HAZARDS/ REMARKS		PRESERVATION		Hone	None		<del>-  </del>			<u> </u>	<u> </u>				
DL=Drum Liquids CS=Drum Solids	Rad	tu to BID989	TYPE OF C	CONTAINER	Split Spoon Liner	Moisture Resistant Con	L					-			
L=Liquid O=Oil S=Soil SE=Sediment	7,40	10171710101	NO. OF CONTAINER(S)  VOLUME		1	1									
T=Tissue V=Vegitation W=Water WI=Wipe					9918 g		200g								
X=Other	SPECIAL	HANDLING AND/OR STORAGE	SAMPLE I	analysis	SPECIAL INSTRUCTIONS	Content - D2216	;								
SAME	PLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIM	E										
31D994		SOIL	4/29/5	X_	X				_		_				
···			, , ,	2090	<u> </u>	<u> </u>				E	<b>3C</b> 0595	_			
								_ <u> </u>							
-												<u> </u>			
CHAIN OF P	OSSESSION		SIGN/ PRIN	T NAMES			!	PECIAL INST							
MRWE 100	D BY/REMOVE	74 95 0016	RECEIVED BY/		3 6/2°	DATE/T	735 719 IME		rbonate Contei Ory Sieve) - D4	<b>122</b> ;		937, Fai di	de Densie	- 2031,	
RELINQUISHED BY/REMOVED FROM 570-705  RELINQUISHED BY/REMOVED FROM / DATE/TIME			RECEIVED BY/STORED IN DT 07 05 9: W				20	SDG# H32\$6							
-Rex	KELLEL D BY/REMOVE	huly 7/08/05 16:00				DATE/T									
•	D BY/REMOVE	•	RECEIVED BY/STORED IN DATE/TIME												
	RECE	IVED BY						ITLE					DATE/TIM		· <del></del>
SECTIO	N DYSS	DON HUSKEY DO	m Kinle	·g	SR. EN	IG. TEC	4 SH	IAW BII	/ETAC			7/11/	DS O	930	
FINAL SAM DISPOSIT	PLE ]	Anur (Jr.) IIAn													
v-6003-618(03/0	)3)														

	Fluor	Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQ						QUEST				PAGE 1	OF 1	
COLLECTOR Pope/Pfister/	l /Mokler/Weis/T	yra	COMPANY CONTACT TELEPHONE NO. TRENT, SJ 373-5869					PROJECT (	COORDINATOR	NATOR PRICE CO		8N	TUF	DATA KNAROUND	
SAMPLING	LOCATION		PROJECT DESIGNATION					SAF NO.	SAF NO. AIR QUALITY				45	Days /	+ 1
216-A-8, I	-8	_	216-A-8 Crib Characterization Borehole					F05-023					ب 	3 200	/30/S
ICE CHEST	190 00	me!	FIELD LOGBOO	K NO.		COA		,	F SHIPMENT					•	
/sth	(1-03-1	018	HNF-N-336-1			119152ES10		FEDERAL E	DXPRESS						_
SHIPPED TO	)		OFFSITE PROP	ERTY NO.	اسر.	ל אוד		BILL OF LABENG ATR BILL NO			5711	1			
Shaw Group			2	er r kr	198	44			SLITT.	<u>را</u> ر	<u> </u>	·			
MATRIX* A=Air DL=Drum		SAMPLE HAZARDS/ REMARKS	PRESER	PRESERVATION		None									
Liquids OS=Orum Solids	Kad -	tu 2010190	TYPE OF C	TYPE OF CONTAINER		Moisture Resistant Cont	: 								
L=Liquid   O=Qi    S=Soi    SE=Sediment	746		NO. OF CONTAINER(S)		1	1									
T=Tissue V=Vegitation W=Water			VOLUME SAMPLE ANALYSIS		1500g 3557	E 2000									
Wi=Wipe X≃Other	SPECIAL	HANDLING AND/OR STORAGE			SEE ITEM (1) II SPECIAL INSTRUCTIONS	Hoisture Content - D2216;						_			
SAMI	PLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME									2.0		ĺ
B1D995	<del></del>	SOIL	1.12115	0705	X	ン	_				1				1
			(d 2010)	0,700			<del> </del>	<del>-</del>		ВС	0596	_			7
<u> </u>				<del> </del>	<del> </del>		<del> </del>		<del> </del>						-
				<del> </del>	<del> </del>	+			+					<del></del> -	·
				<b> </b>			<del> </del> -		<del>  -                                   </del>						1
CHAIN OF P	OCCESSION		SIGN/ PRINT	T NAMES	<u> </u>	<u> </u>	5	PECIAL INSTR	UCTIONS						-
<del></del>		·							bonate Content	; Bulk Den	sity - D293	7; Partid	e Density -	D854;	
RELINQUISHE	D BY REMOVE	LIA 4/305-0935	RECEIVED BY	STORED IN 多Mいるみ	(0)	4305	ine p		ry Sleve) - D42		•	•	•		
BENTHOUISHE	D BY/NIMOVE	PROM DATESTIME	ANCENVED BY	STORED IN	Zalle	עיעאים זו ה									İ
WRAE	$\mathcal{L}, \mathcal{K}_{\mathcal{M}}$	2 7 (405 DESO	11117,620	JUNII.U.	MINI	171105 C	450								Ì
	ED BY/REMOVE	PAUL NUT (1957)	RECEIVED BY	<u> </u>		/ DATE/TI			Dor	# H3	246				
T T	EED E	- 1 1 .	12=		70/50		70								
RELINGUESHE	D SVIREMOVE	FROM 7/08/05 /6:02	RECEIVED BY	STORED IN		DATE/T									
RELINQUISHE	D BY/REMOVE	DERM DATE/TIME	RECEIVED BY/	STORED IN		DATE/T	ME								
RELINQUISHE	D BY/REMOVE	D FROM DATE/TIME	RECEIVED BY	STORED IN	<del></del>	DATE/T	ME					_			
LABORATO	ORY RECEI	IVED BY					<u>`</u>	ITLE	<del></del>			<del></del>	DATE/TIME		าี
SECTIO		an House Am 1	10.	CA. EN.	T 67 H.	SHAZI	ELT!	CTDC			7/	nho	090	30	
FINAL SAM DISPOSIT	<del></del>	ON HIXKEY OM	mely-	SR. ENG	<u> </u>	<u> </u>	0	STOC.				den	DATE/TIME		1
	i														

### SIXX# H3246

PAGE 1

Eberline Srvces

CONTRACT: PO# RSH-SOW-93-0003

PURCHASE ORDER # R5-07-032-SU-SW 07/07/05 13:22:39

ORDER Eberline Services/Richmond	INVOICE Eberline Services/Richmond
FROM Analytical Services	TO Analytical Services
2030 Wright Avenue	2030 Wright Avenue
Richmond, CA 94804-0040	Richmond, CA 94804-0040
ATTEN Purchasing	ATTEN Purchasing
PHONE 510-235-2633	PHONE 510-235-2633 ACTHORIZED BY
DER Shaw Geotechnical Laboratory	Please telephone our Sample Control Department immediately if
	any problems are encountered in the receipt or the analysis of

ORDER Shaw Geotechnical Laboratory

TO 1570 Bear Creek Road

Oak Ridge, TN 37830

Please telephone our Sample Control Department immediately if any problems are encountered in the receipt or the analysis of the samples listed below.

ATTEN Ralph R. Cole

This Purchase Order authorizes Shaw to perform all work listed on the enclosed COC. Alterations to work requested can only be made by Eberline Services or the appropriate Hanford client.

PN

PRACTION	TEST	DESCRIPTION	UNITS	DUE DATE	COST
Ola	E3298	D3473 CALCIUM CARBONATE	Please Advise	08/21/05	0.00
	E3315	D422 Particle Size-Dry Sve	Please Advise	08/21/05	0.00
	E3338	D2216 Moisture Content	Please Advise	08/21/05	0.00
	E335S	D2937 BULK DENSITY DRIV CY	Please Advise	08/21/05	0.00
	E342S	D854 SPECIFIC GRAVITY	Please Advise	08/21/05	0.00
02A	E329S	D3473 CALCIUM CARBONATE	Please Advise	08/21/05	0.00
	E331S	D422 Particle Size-Dry Sve	Please Advise	08/21/05	0.00
	B333S	D2216 Moisture Content	Please Advise	08/21/05	0.00
	E335S	D2937 BULK DENSITY DRIV CY	Please Advise	08/21/05	0.00
	E342S	D854 SPECIFIC GRAVITY	Please Advise	08/21/05	0.00
03A	E329S	D3473 CALCIUM CARBONATE	Please Advise	08/21/05	0.00
	E331S	D422 Particle Size-Dry Sve	Please Advise	08/21/05	0.00
	E333S	D2216 Moisture Content	Please Advise	08/21/05	0.00
	E335S	D2937 BULK DENSITY DRIV CY	Please Advise	08/21/05	0.00
	E342S	D854 SPECIFIC GRAVITY	Please Advise	08/21/05	0.00
04A	E329S	D3473 CALCIUM CARBONATE	Please Advise	08/21/05	0.00
	E3318	D422 Particle Size-Dry Sve	Please Advise	08/21/05	0.00
	E333S	D2216 Moisture Content	Please Advise	08/21/05	0.00
	E335S	D2937 BULK DENSITY DRIV CY	Please Advise	08/21/05	0.00
	E3425	D854 SPECIFIC GRAVITY	Please Advise	08/21/05	0.00
		TOTA	AL CHARGE NOT TO	EXCEED	\$0.00